



PERSONNEL QUALIFICATION STANDARD FOR

SURFACE WARFARE OFFICER (SWO) ENGINEERING

NAME (Rate/Rank) _____

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Although the words “he”, “him,” and “his” are used sparingly in this manual to enhance communication, they are not intended to be gender driven nor to affront or discriminate against anyone reading this material.

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INTRODUCTION

PQS PROGRAM

This PQS program is a qualification system for officers and enlisted personnel where certification of a minimum level of competency is required prior to qualifying to perform specific duties. A PQS is a compilation of the minimum knowledge and skills that an individual must demonstrate in order to qualify to stand watches or perform other specific routine duties necessary for the safety, security or proper operation of a ship, aircraft or support system. The objective of PQS is to standardize and facilitate these qualifications.

CANCELLATION

This Standard cancels and supersedes NAVEDTRA 43101-3E.

APPLICABILITY

This PQS is applicable to those pursuing Surface Warfare Officer qualifications who meet one of the following eligibility requirements:

- (1) Commissioned officers permanently assigned to a commissioned U.S. Navy surface ship; specifically, Surface Warfare and Special Operations trainees (116X/119X), lateral transfers into Surface Warfare, surface Limited Duty Officers (61XX, 640X, 648X), and Chief Warrant Officers (711X, 712X, 713X, 714X, 716X, 718X, 719X, 720X, 740X, 748X).
- (2) Permanently assigned exchange officers from the Coast Guard and foreign navies. (Authorization to wear insignia rests with the parent service or country of the officer concerned).
- (3) Ready Reserve Officer (Inactive Duty) permanently assigned to the crew of a Naval Reserve Force ship or a Ship Augmentation Unit for a ship."

MODEL MANAGER

The Model Manager Command manages a specific PQS manual. This includes overseeing the process of monitoring and updating assigned PQS manuals from the standpoint of technical content and relevance within the community.

INTRODUCTION (CONT'D)

TAILORING

To command tailor this package, first have it reviewed by one or more of your most qualified individuals. Delete any portions covering systems and equipment not installed on your ship, aircraft or unit. Next, add any line items, fundamentals, systems and watchstations/workstations that are unique to your command but not already covered in this package. Finally, the package should be reviewed by the cognizant department head and required changes approved by the Commanding Officer or his designated representative. Retain the approved master copy on file for use in tailoring individual packages.

QUALIFIER

The PQS Qualifier is designated in writing by the Commanding Officer to sign off individual watchstations. The names of designated Qualifiers should be made known to all members of the unit or department. The means of maintaining this listing is at the discretion of individual commands. For more information on the duties and responsibilities of PQS Qualifiers, see the PQS Unit Coordinator's Guide.

CONTENTS

PQS is divided into three sections. The 100 Section (Fundamentals) contains the fundamental knowledge from technical manuals and other texts necessary to satisfactorily understand the watchstation/workstation duties. The 200 Section (Systems) is designed to acquaint you with the systems you will be required to operate at your watchstation/workstation. The 300 Section (Watchstations) lists the tasks you will be required to satisfactorily perform in order to achieve final PQS qualification for a particular watchstation/workstation. All three sections may not apply to this PQS, but where applicable, detailed explanations are provided at the front of each section.

REFERENCES

The references used during the writing of this PQS package were the latest available to the workshop, however, the most current references available should be used when qualifying with this Standard.

NOTES

Classified references may be used in the development of PQS. If such references are used, do not make notes in this book as answers to questions in this Standard may be classified.

INTRODUCTION (CONT'D)

TRAINEE

Your supervisor will tell you which watchstations/workstations you are to complete and in what order. Before getting started, turn to the 300 Section first and find your watchstation/workstation. This will tell you what you should do before starting your watchstation/workstation tasks. You may be required to complete another PQS, a school, or other watchstations/workstations within this package. It will also tell you which fundamentals and/or systems from this package you must complete prior to qualification at your watchstation/workstation. If you have any questions or are unable to locate references, contact your supervisor or qualifier. Good luck!

PQS FEEDBACK REPORTS

This PQS was developed using information available at the time of writing. When equipment and requirements change, the PQS needs to be revised. The only way the PQS Development Group knows of these changes is by you, the user, telling us either in a letter or via the Feedback Report contained in the back of this book. You can tell us of new systems and requirements, or of errors you find.

SUMMARY OF CHANGES

CHANGES TO FUNDAMENTALS, SYSTEMS, AND WATCHSTATIONS:

<u>Fundamental Title</u>	<u>Action</u>	<u>Comment</u>
Engineering Safety Precautions	Deleted	Pertinent questions moved to Navy Occupational Safety and Health Program to meet current training requirements and procedures
Hearing Conservation Program	Deleted	Pertinent questions moved to Navy Occupational Safety and Health Program to meet current training requirements and procedures
Shipboard Heat Stress Control Program	Deleted	Pertinent questions moved to Navy Occupational Safety and Health Program to meet current training requirements and procedures
Sight Conservation Program	Deleted	Pertinent questions moved to Navy Occupational Safety and Health Program to meet current training requirements and procedures
Boiler	Deleted	Pertinent questions moved to other fundamentals to meet current training requirements and procedures
Fuel Oil Quality Management Program	Deleted	Pertinent questions moved to other fundamentals to meet current training requirements and procedures
Physical Security	Deleted	Pertinent questions moved to Engineering Administration to meet current training requirements and procedures

CHANGES TO FUNDAMENTALS, SYSTEMS, AND WATCHSTATIONS (CONT'D)

<u>Fundamental Title</u>	<u>Action</u>	<u>Comment</u>
Hazardous Material Control and Management (HMC&M) Program	Deleted	Pertinent questions moved to Navy Occupational Safety and Health Program to meet current training requirements and procedures
Lubricating Oil Quality Management Program	Deleted	Pertinent questions moved to other fundamentals to meet current training requirements and procedures
Pollution Control	Added	Added to meet current training requirements and procedures
Propulsion Cycle	Added	Added to meet current training requirements and procedures
Propulsion Boiler	Added	Added to meet current training requirements and procedures
<u>System Title</u>	<u>Action</u>	<u>Comment</u>
Basic Steam Cycle	Deleted	Pertinent questions moved to other systems to meet current training requirements and procedures
Combustion Air and Gas	Deleted	Pertinent questions moved to other systems to meet current training requirements and procedures
Desuperheated Steam	Deleted	Pertinent questions moved to other systems to meet current training requirements and procedures
Deaerating Feed Tank (DFT)	Deleted	Pertinent questions moved to other systems to meet current training requirements and procedures

CHANGES TO FUNDAMENTALS, SYSTEMS, AND WATCHSTATIONS (CONT'D)

<u>System Title</u>	<u>Action</u>	<u>Comment</u>
Main Condenser/Main Condenser Seawater Circulating	Deleted	Pertinent questions moved to other systems to meet current training requirements and procedures
Ballast, Deballast, and Stripping	Deleted	Pertinent questions moved to other systems to meet current training requirements and procedures
Main Shafting, Bearings, and Propeller	Deleted	Pertinent questions moved to other systems to meet current training requirements and procedures
Steam Plant Automatic Boiler Control	Deleted	Pertinent questions moved to other systems to meet current training requirements and procedures
Distilling Plant	Deleted	Pertinent questions moved to other systems to meet current training requirements and procedures
Fresh Water Service and Transfer	Deleted	Pertinent questions moved to other systems to meet current training requirements and procedures
Steam Drain Collecting	Deleted	Pertinent questions moved to other systems to meet current training requirements and procedures
Main Turbine Gland Sealing Steam	Deleted	Pertinent questions moved to other systems to meet current training requirements and procedures
Main Air Removal	Deleted	Pertinent questions moved to other systems to meet current training requirements and procedures

CHANGES TO FUNDAMENTALS, SYSTEMS, AND WATCHSTATIONS (CONT'D)

<u>System Title</u>	<u>Action</u>	<u>Comment</u>
Air-Conditioning and Refrigeration	Deleted	Pertinent questions moved to other systems to meet current training requirements and procedures
Underwater Log	Deleted	Pertinent questions moved to other systems to meet current training requirements and procedures
Salinity-Indicating	Deleted	Pertinent questions moved to other systems to meet current training requirements and procedures
Alarm Panels	Deleted	Pertinent questions moved to other systems to meet current training requirements and procedures
Sound-Powered Telephone Communication	Deleted	Pertinent questions moved to other systems to meet current training requirements and procedures
Amplified Voice Communication	Deleted	Pertinent questions moved to other systems to meet current training requirements and procedures
Main Interior Communications (IC) Switchboard	Deleted	Pertinent questions moved to other systems to meet current training requirements and procedures
Degaussing	Deleted	Pertinent questions moved to other systems to meet current training requirements and procedures
Gas Turbine Lube Oil	Deleted	Pertinent questions moved to other systems to meet current training requirements and procedures

CHANGES TO FUNDAMENTALS, SYSTEMS, AND WATCHSTATIONS (CONT'D)

<u>System Title</u>	<u>Action</u>	<u>Comment</u>
Propulsion and Auxiliary Boilers	Modified	Modified to meet current training requirements and procedures
Propulsion Turbine and Reduction Gear	Modified	Modified to meet current training requirements and procedures
Gas Turbine Engine Fuel	Modified	Modified to meet current training requirements and procedures
Fuel Oil Service and Speed Governing	Modified	Modified to meet current training requirements and procedures

<u>Watchstation Title</u>	<u>Action</u>	<u>Comment</u>
Surface Warfare Officer (SWO) Engineering (Steam Plant)	Modified	Modified to meet current training requirements and procedures
Surface Warfare Officer (SWO) Engineering (Diesel Plant)	Modified	Modified to meet current training requirements and procedures
Surface Warfare Officer (SWO) Engineering (Gas Turbine)	Modified	Modified to meet current training requirements and procedures

WATCHSTATION REQUALIFICATIONS

Due to changes in policies, systems, or procedures, personnel dealing with the subject matter of this PQS may be required to requalify IAW NAVEDTRA 43100.1, PQS Unit Coordinator's Guide.

The following watchstations regardless of qualifications achieved in previous versions, shall be completed.

None.

ACRONYMS USED IN THIS PQS

Not all acronyms or abbreviations used in this PQS are defined here. The Subject Matter Experts from the Fleet who wrote this Standard determined the following acronyms or abbreviations may not be commonly known throughout their community and should be defined to avoid confusion. If there is a question concerning an acronym or abbreviation not spelled out on this page nor anywhere else in the Standard, use the references listed on the line item containing the acronym or abbreviation in question.

ABC	Automatic Boiler Control
AFFF	Aqueous Film Forming Foam
CCS	Central Control Station
CKT	Circuit
CPP	Controllable Pitch Propeller
DCTT	Damage Control Training Team
DFM	Diesel Fuel Marine
DFT	Deaerating Feed Tank
EDORM	Engineering Department Organization and Regulations Manual
EEBD	Emergency Escape Breathing Device
EOCC	Engineering Operational Casualty Control
EOOW	Engineering Officer of the Watch
EOP	Engineering Operational Procedures
EOS	Enclosed Operating Station
EOSS	Engineering Operational Sequencing System
EOT	Engine Order Telegraph
ERSP	Engine Room Switching Panel
ETT	Engineering Training Team
FOD	Foreign Object Damage
GTM	Gas Turbine Motor
HMC&M	Hazardous Material Control and Management
HP	High Pressure
IC	Interior Communications
IFVG	Integrated Fluid Variable Gearbox
IVCS	Interior Voice Communication System
JFMM	Joint Fleet Maintenance Manual
JP	Jet Propulsion
LCP	Local Control Panel
LOS	Local Operating Station
LOSCA	Lube Oil Storage and Conditioning Assembly
LP	Low Pressure
MCC	Main Control Console
MFBP	Main Feed Booster Pump
MFP	Main Feed Pump
MLOC	Master Light Off Checklist
MMC	Main Machinery Console
MPDE	Main Propulsion Diesel Engine

ACRONYMS USED IN THIS PQS (CONT'D)

MRG	Main Reduction Gear
ORM	Operational Risk Management
PLA	Power Level Angle
RPM	Revolutions Per Minute
SEED	Supplementary Emergency Egress Device
SHML	Ship's Hazardous Material List
SNOK	Standard Notes for Oil King
SSDG	Ship Service Diesel Generator
SSGTG	Ships Service Gas Turbine Generator
SSTG	Ship Service Turbine Generator
STS	Significant Threshold Shift
VSP	Voigth-Schnieder Propeller

100 INTRODUCTION TO FUNDAMENTALS

100.1 INTRODUCTION

This PQS begins with a Fundamentals section covering the basic knowledge and principles needed to understand the equipment or duties to be studied. Normally, you would have acquired the knowledge required in the Fundamentals section during the school phase of your training. If you have not been to school or if you need a refresher, the references listed at the beginning of each fundamental will aid you in a self-study program. All references cited for study are selected according to their credibility and availability.

100.2 HOW TO COMPLETE

The fundamentals you will have to complete are listed in the watchstation (300 section) for each watchstation. You should complete all required fundamentals before starting the systems and watchstation portions of this PQS, since knowledge gained from fundamentals will aid you in understanding the systems and your watchstation tasks. When you feel you have a complete understanding of one fundamental or more, contact your Qualifier. If you are attempting initial qualification, your Qualifier will expect you to satisfactorily answer all line items in the fundamentals. If you are requalifying or have completed the appropriate schools, your Qualifier may require you to answer representative line items to determine if you have retained the necessary knowledge for your watchstation. If your command requires an oral board or written examination for final qualification, you may be asked any questions from the fundamentals required for your watchstation.

101 NAVY OCCUPATIONAL SAFETY AND HEALTH PROGRAM FUNDAMENTALS

References:

- [a] OPNAVINST 5100.19D (Change 1), Navy Occupational Safety and Health (NAVOSH) Program Manual for Forces Afloat
 - [b] Engineering Operational Sequencing System (EOSS)
 - [c] NSTM S9086-KC-STM-010/300R5, Electric Plant - General
 - [d] NSTM S9086-S3-STM-010/555V1R9, Surface Ship Firefighting
 - [e] OPNAVINST 3500.39A, Operational Risk Management
 - [f] Ships Diagram
-

101.1 Asbestos Control Program: [ref. a, vol. I, ch. B1; ref. b]

- a. Discuss the requirements that dictate the type of asbestos control program aboard your ship
- b. Explain what asbestos is used for
- c. Describe the health hazards associated with the use of asbestos
- d. State when and where asbestos warning signs and labels shall be placed

(Signature and Date)

.2 Heat Stress Program: [ref. a, vol. I, ch. B2; ref. b]

- a. State the purpose of the Heat Stress Program
- b. What are the Division Officers responsibilities
- c. Define heat stress
- d. State the symptoms of heat exhaustion
- e. State the symptoms of heat stroke
- f. State the precautions that must be taken for fighting heat stress
- g. Define the following terms:
 - 1. Personnel recovery period
 - 2. PHEL chart
 - 3. WBGT
- h. State the requirements for the positioning of dry bulb thermometers
- i. State who can authorize the extension of safe stay times

(Signature and Date)

101 NAVY OCCUPATIONAL SAFETY AND HEALTH PROGRAM FUNDAMENTALS (CONT'D)

101.3 Hazardous Material Control and Management Program:
[ref. a, vol. I, ch. B3, vol. II, ch. C23, app. B3-A; ref. b]

- a. Define and discuss the following:
 1. Hazardous material
 2. Hazardous waste
 3. Used or excess HM
 4. HM labeling requirements
 5. Used HM labeling requirements
 6. MSDS
 7. HMIS
 8. HMUG
- b. State where the following documents are located and discuss their contents:
 1. HMIS and MSDS
 2. SHML
 3. List of authorized HM storage locations
 4. Ship's HM inventory
 5. HMUG
- c. Discuss the duties and responsibilities of the following:
 1. Safety Officer
 2. HM Coordinator
 3. Division Officer
 4. Work Center Supervisor
 5. All hands
- d. State the requirements for the collection of used HM
- e. State the restrictions on the open purchase of HM
- f. Discuss the proper stowage procedures for HMC&M
- g. State the HMC&M Program training requirements for all hands

(Signature and Date)

- .4 Discuss flammable material stowage requirements.
[ref. a, vol. I, ch. B3, vol. II, ch. C23, app. B3-A; ref. b]

(Signature and Date)

- .5 Discuss precautions to be observed while handling flammables.
[ref. a, vol. I, ch. B3, vol. II, ch. C23, app. B3-A; ref. b]

(Signature and Date)

101 NAVY OCCUPATIONAL SAFETY AND HEALTH PROGRAM FUNDAMENTALS (CONT'D)

101.6 Hearing Conservation Program: [ref. a, vol. I, ch. B4; ref. b]

- a. State who is covered under the Hearing Conservation Program
- b. State when hearing tests are required
- c. Describe the hearing protective devices used aboard ship
- d. Describe events that require the wearing of hearing protective devices (single or double)
- e. State where hazardous noise warning labels and decals are placed
- f. State the purpose of monitoring hearing tests
- g. State what action is taken if a STS is identified

(Signature and Date)

.7 Sight Conservation Program: [ref. a, vol. I, ch. B5; ref. b]

- a. State when eye protection must be worn
- b. Describe the elements of the Sight Conservation Program
- c. State how eye hazard areas are posted and marked
- d. Discuss the procedures governing the use of temporary protective eyewear
- e. State where emergency eyewash facilities are to be located
- f. State what the marking requirements are for an emergency eyewash station

(Signature and Date)

.8 Respiratory Protection Program: [ref. a, vol. I, ch. B6; ref. b]

- a. State the Division Officer's responsibilities
- b. State the different types of respirators and their applications
- c. State the limitations of respirators

(Signature and Date)

.9 Electrical Safety Program:

- a. State the Division Officer's responsibilities [ref. a, vol. II, ch. C9]
- b. State the electrical safety requirements of all hands [ref. a, vol. II, ch. C9]
- c. State the requirements to work on de-energized equipment [ref. a, vol. II, ch. C9]
- d. State the requirements to work on energized equipment [ref. c, sec. 2]
- e. Discuss who can grant permission to work on energized equipment [ref. c, sec. 2]

101 NAVY OCCUPATIONAL SAFETY AND HEALTH PROGRAM FUNDAMENTALS (CONT'D)

- 101.9
- f. State the procedures and requirements for portable electrical tool issue [ref. c, sec. 2]
 - g. State the first aid procedures for electrical shock [ref. a, vol. II, ch. C9]
 - h. Discuss the procedures for removing a victim from an energized circuit [ref. a, vol. II, ch. C9]
 - i. Describe how changes in the body caused by the environment (sweat, moisture, etc.) change the way electrical shock affects the body [ref. c, app. C]

(Signature and Date)

- .10 State the responsibilities for all hands prior to entering any unventilated space. [ref. a, vol. I, ch. B8]

(Signature and Date)

- .11 Personal protective equipment: [ref. a, vol. I, ch. B12; ref. b; ref. d, sec. 8]
- a. State the Division Officer's responsibilities
 - b. State the protection provided by the following safety equipment, including examples of ship evolutions that require their use:
 - 1. Long sleeved shirt
 - 2. Hard hat
 - 3. Gloves
 - 4. Safety shoes
 - 5. Safety harness and Dyna-Brake
 - 6. Life jacket
 - 7. EEBD/SEED
 - 8. Fire retardant coveralls

(Signature and Date)

- .12 Basic safety:
- a. Describe the locations of major equipment indicating access and escape trunks in each of the major main spaces [ref. f]
 - b. Define and describe the safety requirements contained in the MLOC [ref. a, vol. II, ch. C1; ref. b]

(Signature and Date)

101 NAVY OCCUPATIONAL SAFETY AND HEALTH PROGRAM FUNDAMENTALS (CONT'D)

- 101.13 State the safety precautions to be observed and/or personnel safety equipment/devices required for welding, cutting, and brazing. [ref. a, vol. II, ch. C11]

(Signature and Date)

- .14 Machinery: [ref. a, vol. II, ch. C13]

- a. State the general safety precautions to be observed around machinery
- b. State good housekeeping practices to be observed around machinery
- c. State safety precautions while working with pneumatic tools

(Signature and Date)

- .15 Discuss the concept of ORM. [ref. e]

(Signature and Date)

- .16 Explain the following as they apply to ORM: [ref. e]

- a. Identifying hazards
- b. Assessing hazards
- c. Making risk decisions
- d. Implementing controls
- e. Supervising

(Signature and Date)

102 ENGINEERING ADMINISTRATION FUNDAMENTALS

References:

- [a] OPNAVINST 3120.32C (Change 4), Standard Organization and Regulations of the U.S. Navy (SORM)
 - [b] Engineering Department Organization and Regulations Manual (EDORM)
 - [c] OPNAVINST 5100.19D (Change 1), Navy Occupational Safety and Health (NAVOSH) Program Manual for Forces Afloat
 - [d] OPNAVINST 5090.1B, Environmental and Natural Resources Program Manual
 - [e] NAVSEA Technical Publication S0400-AD-URM-010/TUM, Tag-out Users Manual
 - [f] CINCLANTFLT/PACFLTINST 4790.3 (Change 5), Joint Fleet Maintenance Manual
 - [g] Engineering Operational Sequencing System (EOSS)
 - [h] NSTM S9086-CZ-STM-010/CH-090R2, Inspections, Tests, Records, and Reports
 - [i] COMNAVSURFORINST 3502.1, Surface Force Training Manual
 - [j] Commanding Officer's Standing Orders
 - [k] Ships Instructions
-

102.1 State the information available in the following publications:

- a. EOSS [ref. g]
- b. EOCC [ref. g]
- c. EOP [ref. g]
- d. EDORM [ref. b]
- e. JFMM [ref. f]

(Signature and Date)

.2 What are the duties of the following: [ref. b, ch. 2]

- a. Engineer Officer
- b. Main Propulsion Assistant
- c. Damage Control Assistant
- d. Electrical Officer
- e. Auxiliaries Officer

(Signature and Date)

.3 State the in-port and underway engineering watchstations and describe the duties and responsibilities of each watchstander. [ref. b, ch. 2]

(Signature and Date)

102 **ENGINEERING ADMINISTRATION FUNDAMENTALS (CONT'D)**

- 102.4 Discuss events that require the Chief Engineer's permission to conduct.
[ref. b, ch. 3]

(Signature and Date)

- .5 Discuss events that require the Commanding Officer's permission to conduct.
[ref. b, ch. 3]

(Signature and Date)

- .6 Discuss the contents of the Main Space Fire Doctrine. [ref. k]

(Signature and Date)

- .7 Describe the following logs/reports and identify those that are legal records:

- a. Engineering log. [ref. h, sec. 2]
- b. Bell book [ref. h, sec. 2]
- c. Bell log/data log [ref. b, ch. 5]
- d. Fuel and water report [ref. h, sec. 2]
- e. Fueling memorandum [ref. h, sec. 2]
- f. DC closure log [ref. a, sec. 4]

(Signature and Date)

- .8 Describe the information contained in the following documents: [ref. b, ch. 3]

- a. Engineering standing orders
- b. Engineering officer night order book
- c. Light off orders
- d. Temporary standing orders

(Signature and Date)

- .9 State the purpose of the following:

- a. Electrical Safety Program [ref. c, vol. I, ch. B7]
- b. Tag-Out Program [ref. e]
- c. Environmental and Natural Resources Program [ref. d]
- d. Fuel Quality Management Program [ref. b, ch. 5]
- e. Lube Oil Quality Management Program [ref. b, ch. 5]
- f. DCTT [ref. i, ch. 3]

102 ENGINEERING ADMINISTRATION FUNDAMENTALS (CONT'D)

- 102.9
- g. ETT [ref. i, ch. 3]
 - h. Gas-free engineer [ref. c, vol. I, ch. B8]
 - i. Gage Calibration Program [ref. f, vol. 4]
 - j. Quality Maintenance Program [ref. f, vol. 5]

(Signature and Date)

- .10 Explain the following as applies to the Tag-Out Program:

- a. Tag-out log [ref. e]
- b. Duties of authorizing officer, person attaching tag, person checking tag, and repair activity [ref. e]
- c. Use of caution tag [ref. e]
- d. Use of danger tag [ref. e]
- e. Out-of-calibration label [ref. e]
- f. Out-of-commission label [ref. e]
- g. Location and custody of tag-out log and software on your ship [ref. k]
- h. Function and use of instrument log [ref. e]
- i. Function of tag-out log audit [ref. e]
- j. Equipment/conditions requiring Commanding Officer's permission [ref. b, ch. 3]

(Signature and Date)

- .11 Explain your ship's Restricted Maneuvering Doctrine. [ref. j]

(Signature and Date)

- .12 Discuss the following components of the Physical Security Program:
[ref. b, ch. 4]

- a. The purpose of the Physical Security Program
- b. How often engineering spaces aboard your ship must be frequented to keep them from being locked
- c. What engineering spaces aboard your ship are locked during cold iron conditions
- d. To whom you report violations of physical security

(Signature and Date)

103 POLLUTION CONTROL FUNDAMENTALS

References:

- [a] Oil Spills In-port Prevention Video, Pin Number 806628
 - [b] OPNAVINST 5090.1B (Change 2), Environmental and Natural Resources Program Manual
 - [c] NSTM S9086-T8-STM-010/CH-593 (Rev. 4), Pollution Control
 - [d] Engineering Operational Sequencing System (EOSS)
-

103.1 Define the following: [ref. c, sec. 1]

- a. Oily waste
- b. Waste oil

(Signature and Date)

.2 Discuss the legal limitations and liabilities regarding oily waste discharge into the ocean. [ref. c, sec. 3]

(Signature and Date)

.3 State the limits of shipboard waste discharge into the following territorial waters of the United States: [ref. b, ch. 19]

- a. Three mile navigable waters
- b. Twelve mile contiguous zone

(Signature and Date)

.4 Discuss geographic zones and waters other than those of the United States that impose oily waste discharge limitations. [ref. c, sec. 2]

(Signature and Date)

.5 Discuss the limits regarding the disposal of plastic at sea. [ref. c, sec. 1]

(Signature and Date)

103 POLLUTION CONTROL FUNDAMENTALS (CONT'D)

- 103.6 State the requirements for oil spill response within the U.S. contiguous zone.
[ref. b, ch. 19]

(Signature and Date)

- .7 State the requirements for oil spill response outside the U.S. contiguous zone.
[ref. b, ch. 19]

(Signature and Date)

- .8 Discuss how ORM applies to oil transfer evolutions (internal transfers, on-loads, and off-loads). [ref. b, ch. 19]

(Signature and Date)

- .9 State the location and content of the oil spill kit. [ref. b, ch. 19]

(Signature and Date)

- .10 Discuss the use of EOSS procedure SNOK as it applies to oil transfer evolutions.
[ref. d]

(Signature and Date)

- .11 Explain the general operational and management requirements for bilge water, oil, oily waste, and shipboard pollution abatement. [ref. b, ch. 19; ref. d, sec. 3]

(Signature and Date)

- .12 Discuss the information provided in the Oil Spills In-port Prevention video. [ref. a]

(Signature and Date)

104 MECHANICAL FUNDAMENTALS

References:

- [a] NAVEDTRA 14151, Machinist's Mate 3 & 2 (Surface)
 - [b] NAVEDTRA 14104, Fireman
 - [c] NAVEDTRA 14077, Engineman 3
 - [d] NSTM S9086-RK-STM-010/CH-505, Piping Systems
 - [e] NSTM S9086-GY-STM-010/CH-221R4, Boilers
 - [f] Introduction to Naval Engineering, Second Edition
 - [g] Engineering Operational Sequencing System (EOSS)
-

104.1 State the purpose or function of the following items/terms associated with valves:

- a. Butterfly [ref. a, ch. 10]
- b. Check [ref. a, ch. 10]
- c. Gate [ref. a, ch. 10]
- d. Remote operated [ref. b, ch. 13]
- e. Ball [ref. a, ch. 10]
- f. Needle [ref. b, ch. 9]
- g. Pilot operated [ref. a, ch. 10]
- h. Pressure reducer [ref. b, ch. 9]
- i. Relief [ref. a, ch. 10]
- j. Safety [ref. a, ch. 16]
- k. Sentinel [ref. a, ch. 10]
- l. Stop-check [ref. b, ch. 9]
- m. Thermostatic control [ref. a, ch. 10]
- n. Unloading [ref. c, ch. 10]
- o. Root [ref. a, app. I]
- p. Guarding [ref. a, ch. 16]

(Signature and Date)

.2 State the purpose or function of the following items/terms associated with tanks:

- a. Storage [ref. a, ch. 8]
- b. Water compensated storage [ref. a, ch. 8]
- c. Service [ref. a, app. I]
- d. Settling [ref. a, ch. 4]
- e. Collecting [ref. a, ch. 6, 18]
- f. Overflow [ref. a, ch. 14]
- g. Stripping [ref. a, ch. 8]
- h. Swash plates/baffles [ref. a, app. I]

104 MECHANICAL FUNDAMENTALS (CONT'D)

- 104.2
- i. Vent [ref. a, app. I]
 - j. Sounding tube [ref. c, app. I]
 - k. Ballast [ref. f, Glossary]

(Signature and Date)

- .3 State the function of the following indicating devices: [ref. b]

- a. Bimetallic thermometer [ch. 11]
- b. Differential pressure gage [ch. 11]
- c. Duplex pressure gage [ch. 11]
- d. Liquid-in-glass thermometer [ch. 11]
- e. Revolution counter [ch. 11]
- f. Salinity indicator [ch. 11]
- g. Simplex pressure gage [ch. 11]
- h. Compound gage [ch. 11]
- i. Sounding tape [ch. 1]
- j. Sight/gage glass [app. I]
- k. Tank level indicator [ch. 11]

(Signature and Date)

- .4 State the function of each of the following heat exchanger terms:

- a. Shell and tube [ref. a, ch. 6]
- b. Plate [ref. a, ch. 6]
- c. Conduction [ref. f]
- d. Convection [ref. f]
- e. Radiation [ref. f]

(Signature and Date)

- .5 Discuss the basic principles of operation and the use of each of the following pumps: [ref. a, ch. 5]

- a. Centrifugal
- b. Jet
- c. Propeller
- d. Reciprocating
- e. Rotary

(Signature and Date)

104 MECHANICAL FUNDAMENTALS (CONT'D)

104.6 Define the following terms used with governors: [ref. c]

- a. Hunting [ch. 9]
- b. Set point [app. I]
- c. Speed droop [ch. 9]
- d. Surging [app. I]

(Signature and Date)

.7 State the use of the following: [ref. a, ch. 2]

- a. Constant speed governor
- b. Speed limiting governor

(Signature and Date)

.8 Discuss each of the following general type of governors: [ref. a, ch. 2]

- a. Mechanical
- b. Hydraulic

(Signature and Date)

.9 State the color code for the following systems: [ref. d, ch. 7]

- a. Firemain
- b. AFFF
- c. Fuel oil
- d. JP-5
- e. LP air
- f. HP air
- g. Hydraulic
- h. Lube oil
- i. Potable water
- j. Seawater
- k. Chill water
- l. Sewage
- m. Refrigerants
- n. Steam
- o. Oily waste

(Signature and Date)

104 MECHANICAL FUNDAMENTALS (CONT'D)

104.10 Define the following terms as applied to the operation and testing of machinery equipment:

- a. Align [ref. g]
- b. Bypass [ref. g]
- c. Circulating [ref. g]
- d. Cold iron [ref. g]
- e. Crack (open)/unseat [ref. g]
- f. Cross-connect [ref. g]
- g. Cutout [ref. g]
- h. Drain/vent [ref. g]
- i. Disengage [ref. g]
- j. Engage [ref. g]
- k. Hydrostatic test [ref. e, ch. 2; ref. g]
- l. Inlet/suction [ref. g]
- m. Leakage rate (leakoff) [ref. g]
- n. Light-off [ref. g]
- o. Local manual [ref. e, ch. 4; ref. g]
- p. Remote manual [ref. e, ch. 4; ref. g]
- q. Sound [ref. g]
- r. Standby [ref. g]
- s. Throttle [ref. g]
- t. Top-off [ref. g]
- u. Vent [ref. g]
- v. Warm-up [ref. g]
- w. Place on line [ref. g]
- x. Recirculating [ref. g]

(Signature and Date)

.11 State the use of each of the following: [ref. g, ch. 1]

- a. Lagging
- b. Flange spray shield
- c. Pipe hangers and supports
- d. Sound isolation mounts

(Signature and Date)

105 ELECTRICAL FUNDAMENTALS

References:

- [a] NAVEDTRA 14073, Electrician's Mate 3 & 2
 - [b] NAVEDTRA 14173, NEETS Module 1 - Introduction to Matter, Energy, and Direct Current
 - [c] NAVEDTRA 14174, NEETS Module 2 - Introduction to Alternating Current and Transformers
 - [d] NAVEDTRA 14175, NEETS Module 3 - Introduction to Circuit Protection, Control, and Measurement
 - [e] NAVEDTRA 14177, NEETS Module 5 - Introduction to Generators and Motors
 - [f] NSTM S9086-KY-STM-010/CH-320, Electric Power Distribution Systems
 - [g] NAVEDTRA 14077, Engineman 3
 - [h] NAVEDTRA 14120, Interior Communication Electrician, Vol. 1
 - [i] NSTM S9086-KN-STM-010/310R2, Electrical Power Generators and Conversion Equipment
 - [j] NSTM S9086-KC-STM-010/300R5, Electrical Plant - General
 - [k] Propulsion Plant Manual (PPM)
-

105.1 State the basic units of measure, symbols, or abbreviations for the following:

- a. Current [ref. b, app. I]
- b. Frequency [ref. a, app. I]
- c. Potential [ref. a, app. I]
- d. Power [ref. a, app. I]
- e. Resistance [ref. b, app. I]

(Signature and Date)

.2 Discuss the applications and functions of the following: [ref. f, sec. 1]

- a. Main switchboard
- b. Load centers
- c. Distribution/power panel
- d. Fuse box
- e. Emergency switchboard

(Signature and Date)

.3 State the electrical function of the following indicators:

- a. Ammeter [ref. d, ch. 1]
- b. Annunciator [ref. h, app. I]

105 ELECTRICAL FUNDAMENTALS (CONT'D)

- 105.3
- c. Blown fuse indicator [ref. d, ch. 2]
 - d. Frequency meter [ref. d, ch. 1]
 - e. Ground indicator [ref. a, ch. 4]
 - f. Wattmeter [ref. a, ch. 4]
 - g. Synchronizing monitor [ref. a, ch. 4]
 - h. Synchroscope [ref. a, ch. 4]
 - i. Voltmeter [ref. d, ch. 1]

(Signature and Date)

.4 Define the following:

- a. AC [ref. c, ch. 1]
- b. APD [ref. k]
- c. ABT [ref. a, ch. 7]
- d. Bus [ref. f, sec. 1]
- e. Bus tie [ref. f, sec 1]
- f. Casualty power [ref. a, ch. 3]
- g. Conductor [ref. b, app I]
- h. DC [ref. b, ch. 3]
- i. Droop [ref. g, ch. 9]
- j. Isochronous governor [ref. i]
- k. MBT [ref. a, ch. 4]
- l. Mimic bus [ref. f, sec. 1]
- m. Parallel circuit [ref. b, app. I]
- n. Polarity [ref. b, app. I]
- o. Prime mover [ref. e, ch. 3]
- p. Power factor [ref. c, ch. 4]
- q. Reverse power relay [ref. a, ch. 3]
- r. Rheostat [ref. b, app. I]
- s. Series circuit [ref. b, app. I]
- t. Shore power [ref. a, ch. 3]
- u. Solenoid [ref. d, ch. 3]
- v. Spilt plant [ref. a, ch. 4]
- w. Ungrounded system [ref. f, sec. 1]
- x. Voltage regulator [ref. a, ch. 4]
- y. Selective tripping [ref. d, chs. 2, 3]
- z. Load shedding [ref. d, chs. 2, 3]
- aa. Selected tripping [ref. d, chs. 2, 3]
- ab. Deranged equipment [ref. h, ch. 2]
- ac. Synchronizing protective device [ref. i, sec. 1]

(Signature and Date)

105 ELECTRICAL FUNDAMENTALS (CONT'D)

105.5 Describe the applications of the following switches:

- a. Toggle [ref. d, ch. 3]
- b. Push button [ref. d, ch. 3]
- c. Rotary snap [ref. d, ch. 3]
- d. Rotary selector [ref. d, ch. 3]
- e. Microswitch (precision snap-acting switch) [ref. d, ch. 3]
- f. Magnetically operated (relay, solenoid) [ref. d, ch. 3]
- g. Limit switch (mechanical, magnetic) [ref. d, ch. 3]
- h. Darken ship [ref. a, ch. 4]
- i. Pressure switch (IC/L) [ref. j, ch. 2]
- j. Thermostatic switch (IC/N) [ref. j, ch. 2]
- k. Liquid level float switch [ref. j, ch. 2]

(Signature and Date)

.6 Discuss Ohm's law. [ref. a, ch. 3]

(Signature and Date)

.7 State the procedures for rigging and unrigging: [ref. a, ch. 4]

- a. Shore power
- b. Casualty power

(Signature and Date)

.8 Discuss the meaning of the following terms associated with shipboard electrical motor controllers: [ref. a, ch. 5]

- a. Overload protection
- b. Low voltage protection
- c. Low voltage release/low voltage release effect

(Signature and Date)

.9 Explain the basic principle of electrical power generation. [ref. c, ch. 1]

(Signature and Date)

105 ELECTRICAL FUNDAMENTALS (CONT'D)

105.10 State the function of the following devices:

- a. Circuit breakers [ref. a, ch. 3]
- b. Fuse [ref. d, ch. 2]
- c. Generator [ref. e, app. I]
- d. Motor [ref. e, app. I]
- e. Reverse power relay [ref. a, ch. 3]
- f. Transformer [ref. c, ch. 5]

(Signature and Date)

.11 Describe the effects of a ground in more than one phase of a three-phase power supply. [ref. i, sec. 1]

(Signature and Date)

.12 Discuss the criteria used when inspecting a fuse panel, to include: [ref. d]

- a. Rating [ch. 1]
- b. Ferrule type [ch. 1]
- c. Impact of over/under fusing on equipment [ch. 3]

(Signature and Date)

106 LUBRICATING AND HYDRAULIC OIL FUNDAMENTALS

References:

- [a] NSTM S9086-H7-STM-010/CH-262R6, Lubricating Oils, Greases, Specialty Lubricants, and Lubrication Systems
 - [b] NAVEDTRA 14077, Engineman 3
 - [c] NSTM S9086-S4-STM-010/CH556, Hydraulic Equipment (Power Transmission and Control)
-

106.1 Define the following terms:

- a. Acidity testing [ref. a, sec. 5]
- b. Adhesion [ref. b, ch. 8]
- c. BS & W test [ref. a, sec. 5]
- d. Clear and bright [ref. a, sec. 5]
- e. Cohesion [ref. b, ch. 8]
- f. Demulsibility [ref. a, sec. 1; ref. b, ch. 8]
- g. Transparency test [ref. a, sec. 5]
- h. Viscosity [ref. a, sec. 1; ref. b, ch. 8]
- i. Visible sediment test [ref. a, sec. 5]
- j. Neutralization number [ref. a, sec. 1; ref. b, ch. 8]
- k. Sludge [ref. b, ch. 8]

(Signature and Date)

.2 Define the following types of friction: [ref. b, ch. 8]

- a. Static
- b. Kinetic
- c. Sliding
- d. Rolling
- e. Fluid

(Signature and Date)

.3 State the function of lubricants. [ref. a, sec. 1]

(Signature and Date)

106 LUBRICATING AND HYDRAULIC OIL FUNDAMENTALS (CONT'D)

106.4 State the factors affecting lubrication. [ref. b, ch. 8]

(Signature and Date)

.5 Discuss the following methods of operation associated with the purifier piping system: [ref. a, sec. 3]

- a. Batch
- b. Continuous

(Signature and Date)

.7 State the two most commonly used oil purifiers in naval applications. [ref. a, sec. 3]

(Signature and Date)

.8 State the three types of contamination that are of particular interest for proper performance of hydraulic systems. [ref. c, sec. 8]

(Signature and Date)

107 HYDRAULIC/PNEUMATIC FUNDAMENTALS

References:

- [a] NAVEDTRA 14105, Fluid Power
 - [b] NAVEDTRA 14151, Machinist's Mate 3 & 2 (Surface)
 - [c] NSTM S9086-SY-STM-010/CH-551R2, Compressed Air Plants and Systems
 - [d] Ships Information Book (SIB)
-

107.1 Define the following terms as applied to hydraulics/pneumatics:

- a. Control air supply [ref. b, app. I]
- b. Density [ref. a, app. I]
- c. Displacement [ref. a, app. I]
- d. Force [ref. a, app. I]
- e. High pressure air system [ref. b, ch. 13; ref. c, sec. 1]
- f. Humidity [ref. b, app. I]
- g. Hydraulics [ref. a, app. I]
- h. Low pressure air system [ref. b, ch. 13; ref. c, sec. 1]
- i. Medium pressure [ref. b, ch. 13; ref. c, sec. 1]
- j. Pressure [ref. a, app. I]
- k. Pneumatic [ref. b, app. I]
- l. Sequencing [ref. a, ch. 6]
- m. Velocity [ref. a, app. I]
- n. LP vital/nonvital air [ref. c, sec. 2]
- o. Vol. of flow [ref. a, app. I]

(Signature and Date)

.2 State the function of each of the following:

- a. Air bank [ref. c, sec. 1]
- b. Air flask [ref. c, sec. 1]
- c. Cylinder actuator [ref. a, ch. 10]
- d. Dehydrator [ref. c, sec. 1]
- e. Filters [ref. a, app. I]
- f. Manifold [ref. a, app. I]
- g. Pressure reducing valve [ref. a, ch. 6]
- h. Actuator [ref. a, app. I]
- i. Regulator [ref. a, ch. 6]
- j. Accumulator [ref. a, app. I]
- k. Restrictor, orifice [ref. b, app. I]
- l. Pressure control valves [ref. a, ch. 6]
- m. Priority air valve [ref. c, secs, 1, 2]

107 HYDRAULIC/PNEUMATIC FUNDAMENTALS (CONT'D)

- 107.2 n. Ram-type cylinder actuator [ref. a, ch. 10]
 o. Receiver [ref. a, app. I]
 p. Reservoir [ref. a. app. I]
 q. Rotary actuator [ref. a, ch. 10]
 r. Sequencing valves [ref. a, ch. 6]
 s. Strainers [ref. a, ch. 9, app. I]
 t. Unloader [ref. a, app. I; ref. b, ch. 13]
 u. Flow control valves [ref.a, ch. 6]

(Signature and Date)

- .3 State the type of air compressors used aboard your ship. [ref. d]

(Signature and Date)

- .4 State the type of hydraulic systems aboard your ship and their uses. [ref. d]

(Signature and Date)

108 DISTILLING PLANT/POTABLE WATER FUNDAMENTALS

References:

- [a] NSTM S9086-SC-STM-030/CH-531V3R2, Desalination - Reverse Osmosis Desalination Plants
 [b] NAVEDTRA 14077, Engineman 3
 [c] NSTM S9086-SE-STM-010/CH-533R3, Potable Water Systems
-

108.1 Discuss the following types of distilling plants: [ref. a, secs. 11, 12; ref. b, ch. 15]

- a. Submerged tube
- b. Flash
- c. Reverse osmosis

(Signature and Date)

.2 Discuss the following terms as applied to the distilling process:

- a. Submerged tube/flash type: [ref. b, ch. 15]
 1. Distillation
 2. Evaporation
 3. Condensation
 4. Feed water
 5. Vapor
 6. Distillate
 7. Brine
 8. Salinity
- b. Reverse osmosis type: [ref. a, secs. 11, 12]
 1. Osmosis
 2. Reverse osmosis
 3. Permeable
 4. Membrane

(Signature and Date)

.3 Discuss the following components and their relationship to a typical distilling plant:

- a. Submerged tube/flash type: [ref. b, ch. 15]
 1. Mesh type demisters
 2. Air ejector
 3. Brine eductor/pump
 4. Distillate pump
 5. Distillate sterilizer

108 DISTILLING PLANT/POTABLE WATER FUNDAMENTALS (CONT'D)

- 108.3 a. 6. Distillate cooler
 7. Salinity cell
 8. Three-way solenoid valve
 9. Water meter
 10. Feed pump
 11. Feed heater
 b. Reverse osmosis type [ref. a, secs. 11, 12]
 1. Duplex strainer
 2. Centrifugal separator
 3. Heater
 4. Cartridge filters
 5. Activated carbon filter
 6. Back flow preventer
 7. Feed booster pump
 8. High pressure pump
 9. Pulsation dampers
 10. Reverse osmosis modules

(Signature and Date)

- .4 Discuss the treatment, storage, and distribution of your ships potable water system.
 [ref. c, secs. 2, 3]

(Signature and Date)

109 AIR-CONDITIONING AND REFRIGERATION FUNDAMENTALS

References:

- [a] NSTM S9086-RW-STM-010/CH-516R4, Refrigeration Systems
 - [b] NAVEDTRA 14151, Machinist's Mate 3 & 2 (Surface)
 - [c] NSTM S9086-RQ-STM-010/CH-510R4, Heating, Ventilation, and Air-Conditioning Systems for Surface Ships
-

109.1 Define the following terms as applied to air-conditioning/refrigeration:

- a. Compression [ref. a, sec. 1]
- b. Condensation [ref. a, sec. 1]
- c. Dew point [ref. b, ch. 12]
- d. Evaporation [ref. a, sec. 1]
- e. High side [ref. a, sec. 1]
- f. Latent heat of fusion [ref. a, sec. 1; ref. b, ch. 12]
- g. Latent heat of vaporization [ref. a, sec. 1; ref. b, ch. 12]
- h. Low side [ref. a, sec. 1]
- i. Refrigerant [ref. a, sec. 1]
- j. Refrigeration ton [ref. b, ch. 11]

(Signature and Date)

.2 State the functions of the following main parts of a basic refrigeration cycle:
[ref. a, sec. 3; ref. b, ch. 11]

- a. Compressor
- b. Condenser
- c. Evaporator
- d. Receiver
- e. Thermostatic expansion valve

(Signature and Date)

.3 Discuss the following types of environmental control systems:

- a. Chilled water circulating [ref. b, ch. 12; ref. c, app. a]
- b. Fan coil assemblies [ref. b, ch. 12; ref. c, sec. 4]
- c. Gravity cooling coils [ref. c, sec. 4]

109 AIR-CONDITIONING AND REFRIGERATION FUNDAMENTALS (CONT'D)

- 109.3 d. Self-contained air-conditioners [ref. a, sec. 2; ref. c, sec. 4]
 e. Refrigerant circulating (vapor compression) [ref. b, ch. 12]
 f. Electric heater [ref. b, ch. 12]

(Signature and Date)

- .4 What are the hazards associated with refrigerant leaks in a poorly ventilated/enclosed space and how they are detected? [ref. a, sec. 1]

(Signature and Date)

110 INTERIOR COMMUNICATIONS FUNDAMENTALS

References:

- [a] NSTM S9086-PA-STM-000/CH-430R1, Interior Communication Installations
 - [b] NAVEDTRA 14187, NEETS Module 15 - Principles of Synchros, Servos, and Gyros
 - [c] NAVEDTRA 14120, Interior Communications Electrician, Vol. 1
 - [d] NSTM S9086-NZ-STM-010/CH-420R1, Navigation Systems, Equipment, and Aids
 - [e] Ship's Damage Control Book
 - [f] Ship's Instructions
-

110.1 In what situations are the following audible signal devices used: [ref. c]

- a. Bells [ch. 9]
- b. Buzzers [ch. 9]
- c. Sirens [ch. 9]
- d. Horns [ch. 9]
- e. Bus failure alarms (E1D1) [ch. 3]
- f. Electronic signal unit (E3D2) [ch. 9]

(Signature and Date)

.2 State the applications of the following visual indicators: [ref. c]

- a. Lamp-type [ch. 9]
- b. Annunciator [chs. 4, 5]

(Signature and Date)

.3 Discuss the basic operation of ship's gyro. [ref. b, ch. 3; ref. c, ch. 4]

(Signature and Date)

.4 Discuss the various shipboard systems that receive gyro information.
[ref. c, ch. 4; ref. d, sec. 5]

(Signature and Date)

.5 Discuss the basic operations of synchro and servo systems. [ref. b, chs. 1, 2]

(Signature and Date)

110 INTERIOR COMMUNICATIONS FUNDAMENTALS (CONT'D)

110.6 Discuss the function of the following switchboards: [ref. c]

- a. Main IC [ch. 3]
- b. Local IC [ch. 3]
- c. IC test [ch. 3]
- d. Alarm [ch. 9]

(Signature and Date)

.7 Discuss the application of the following communication circuits: [ref. c, ch. 7]

- a. 1MC
- b. 5MC
- c. 21MC
- d. 26MC

(Signature and Date)

.8 State the uses of the following equipment: [ref. c]

- a. Underwater log (CKT Y) [ch. 10]
- b. Dummy log (CKT 4Y) [ch. 10]
- c. Sound-powered amplifiers [ch. 5]
- d. EOT (CKT MB) [ch. 10]
- e. Propeller revolution order (CKT M) [ch. 10]
- f. Rudder angle indicator (CKT N) [ch. 10]
- g. Rudder angle order circuit (CKT L) [ch. 10]
- h. Steering emergency alarm signal (CKT LB) [ch. 10]
- i. Propeller revolution indicator (CKT M) [ch. 10]
- j. Impressed current cathodic protection [ch. 11]

(Signature and Date)

.9 Describe the function of the following types of detectors:

- a. Combustion gas, smoke, and ionization [ref. c, ch. 9]
- b. Infrared [ref. a, sec. 7]
- c. Rate-of-rise [ref. a, sec. 7]

(Signature and Date)

110 INTERIOR COMMUNICATIONS FUNDAMENTALS (CONT'D)

110.10 Discuss the capability to patch/cross connect sound-powered circuits. [ref. c, ch. 5]

(Signature and Date)

.11 Discuss the following sound-powered circuits and their uses: [ref. c, ch. 5]

- a. JL
- b. 1JV
- c. 2JV
- d. 2JZ
- e. 3JZ
- f. 4JZ
- g. 5JZ
- h. 6JZ
- i. 7JZ
- j. X40J
- k. JA

(Signature and Date)

.12 Discuss wireless communication systems used aboard your ship. [ref. f]

(Signature and Date)

.13 Discuss the operation and use of IVCS. [ref. a, sec. 3]

(Signature and Date)

.14 Discuss the following IVCS nets: [ref. e, sec. 4]

- a. 51
- b. 52
- c. 80
- d. 81
- e. 82
- f. 83
- g. 84
- h. 85
- i. 86

(Signature and Date)

111 DEGAUSSING FUNDAMENTALS

References:

[a] NSTM S9086-QN-STM-010/CH-475R2, Magnetic Silencing

111.1 State the purpose of degaussing. [sec. 2]

(Signature and Date)

.2 Discuss the ship's permanent magnetization. [sec. 2]

(Signature and Date)

.3 Discuss the components of the earth's magnetic field and your ship's influence on them. [sec. 2]

(Signature and Date)

.4 Name the different degaussing coils and state their uses. [sec. 3]

(Signature and Date)

.5 Discuss the contents and use of the degaussing folder. [sec. 6]

(Signature and Date)

.6 Discuss the function of the compass compensating coil. [sec. 8]

(Signature and Date)

112 POWER TRANSMISSION FUNDAMENTALS

References:

- [a] NAVEDTRA 14077, Engineman 3
 - [b] NSTM S9086-HN-STM-010/CH-244R6, Propulsion Bearings and Seals
 - [c] NSTM S9086-HM-STM-010/CH-243, Propulsion Shafting
 - [d] NAVEDTRA 14113, Gas Turbine Systems Technician (Electrical) 3/Gas Turbine Systems Technician (Mechanical) 3, Vol. 1
 - [e] Engineering Operational Sequencing System (EOSS)
-

112.1 Define and discuss the purpose of a power transmission system. [ref. a, ch. 12]

(Signature and Date)

.2 Define the following terms as applied to power transmission:

- a. Drive mechanism [ref. a, ch. 12]
- b. Feet of pitch [ref. a, ch. 12; ref. d, app. I]
- c. Locked shaft [ref. d, ch. 8]
- d. Stop shaft [ref. d, ch. 8]
- e. Trail shaft [ref. e]
- f. Torque [ref. a, ch. 12]

(Signature and Date)

.3 State the function(s) of the following:

- a. Bearing pedestal [ref. c, sec. 2]
- b. Clutch [ref. a, ch. 12; ref. d, ch. 8]
- c. Controlled pitch propeller [ref. a, ch. 12; ref. d, ch. 8]
- d. Flexible coupling [ref. a, ch. 12]
- e. Pitch control unit [ref. a, ch. 12; ref. d, ch. 8]
- f. Pivoted shoe thrust bearing [ref. b, sec. 3]
- g. Prime mover [ref. a, app. I]
- h. Propulsion shaft [ref. c, sec. 1]
- i. Reduction gears [ref. a, ch. 12]
- j. Friction brake [ref. a, ch. 12]
- k. Solid coupling [ref. a, ch. 12]
- l. Spring bearing [ref. a, ch. 12]

(Signature and Date)

112 POWER TRANSMISSION FUNDAMENTALS (CONT'D)

112.4 Discuss the types of clutches used on your ships drive mechanism.
[ref. a, ch. 12; ref. d, ch. 8]

(Signature and Date)

.5 Describe the basic differences between fixed and controllable pitch propellers.
[ref. a, ch. 12]

(Signature and Date)

113 PROPULSION CYCLE FUNDAMENTALS

References:

- [a] NAVEDTRA 14104, Fireman
 - [b] Introduction to Naval Engineering, Second Edition
 - [c] NAVEDTRA 14077, Engineman 3
 - [d] NAVEDTRA 14151, Machinist's Mate 3 & 2 (Surface)
 - [e] Propulsion Plant Manual (PPM)
 - [f] NAVEDTRA 14114, Gas Turbine Systems Technician (Electrical) 3/Gas Turbine Systems Technician (Mechanical) 3, Vol. 2
-

113.1 Discuss the following terms as they apply to shipboard propulsion plants:

- a. Principle of conservation of energy (1st law of thermodynamics) [ref. d, ch. 2]
- b. Principle of conservation of mass (2nd law of thermodynamics) [ref. d, ch. 2]
- c. Latent heat [ref. d, ch. 11]
- d. Sensible heat [ref. d, ch. 11]
- e. Convection [ref. d, ch. 12]
- f. Conduction [ref. d, ch. 12]
- g. Radiant heat [ref. d, ch. 12]
- h. Kinetic energy [ref. d, app. I]
- i. Potential energy [ref. d, app. I]
- j. Work [ref. d, app. I]
- k. Venturi [ref. d, app. I]
- l. Vacuum [ref. d, app. I]
- m. Saturation [ref. d, ch. 9]
- n. Evaporation [ref. d, ch. 9]
- o. Condensation [ref. d, ch. 9]
- p. Combustion [ref. a, ch. 2]
- q. Generation [ref. a, ch. 3]
- r. Intake [ref. c, ch. 2]
- s. Exhaust [ref. c, ch. 2]
- t. Compression [ref. c, ch. 2]
- u. Expansion [ref. a, ch. 3; ref. c, ch. 2]

(Signature and Date)

.2 Discuss the four phases of the basic steam cycle. [ref. a, ch. 3]

(Signature and Date)

113 PROPULSION CYCLE FUNDAMENTALS (CONT'D)

113.3 Discuss the function of the following steam components:

- a. Boiler [ref. a, ch. 4]
- b. Superheater [ref. a, ch. 3]
- c. Desuperheater [ref. a, ch. 4; ref. d, ch. 15]
- d. HP turbine [ref. a, ch. 3]
- e. LP turbine [ref. a, ch. 3]
- f. Astern elements [ref. a, ch. 3]
- g. Main condenser [ref. a, ch. 3]
- h. Main condensate pump [ref. a, ch. 3]
- i. Air ejector condenser [ref. a, ch. 3]
- j. DFT [ref. a, ch. 3]
- k. MFBP [ref. a, ch. 3]
- l. MFP [ref. a, ch. 3]
- m. Economizer [ref. a, ch. 3]

(Signature and Date)

.4 Define the following terms: [ref. a, ch. 2; ref. d, app. I]

- a. Saturated steam
- b. Superheated steam
- c. Auxiliary steam
- d. Main steam
- e. Desuperheated steam
- f. Auxiliary exhaust
- g. Main condensate
- h. Auxiliary condensate
- i. Main feed

(Signature and Date)

.5 Discuss the five phases of the basic diesel cycle. [ref. c, ch. 2]

(Signature and Date)

.6 Discuss the purpose of the following diesel engine major components: [ref. c]

- a. Cylinder block [ch. 3]
- b. Cylinder [ch. 3]
- c. Piston [ch. 4]
- d. Connecting rod [ch. 4]
- e. Camshaft [ch. 4]

113 **PROPULSION CYCLE FUNDAMENTALS (CONT'D)**

- 113.6 f. Intake and exhaust ports/valves [ch. 4]
 g. Crankshaft [ch. 4]
 h. Turbocharger [chs. 3, 6]
 i. Fuel injectors [ch. 9]

(Signature and Date)

- .7 Discuss the five phases of the basic gas turbine (Brayton) cycle. [ref. f, ch. 1]

(Signature and Date)

- .8 Discuss the purpose of the following gas turbine engine major components:
[ref. f, ch. 2]

- a. Compressor
- b. Combustor
- c. HP turbine
- d. Power turbine
- e. Accessory gearbox
- f. Intake
- g. Exhaust

(Signature and Date)

- .9 Discuss the sources and end use applications of bleed air: [ref. e]

- a. Within the engineering plant
- b. Outside the engineering plant

(Signature and Date)

- .10 State and compare the advantages and disadvantages of various propulsion systems. [ref. b, ch. 13]

(Signature and Date)

114 PROPULSION BOILER FUNDAMENTALS

References:

- [a] NAVEDTRA 14104, Fireman
 - [b] NAVEDTRA 14151, Machinist's Mate 3 & 2 (Surface)
 - [c] NSTM S9086-GY-STM-010/CH-221R4, Boilers
 - [d] Engineering Operational Sequencing System (EOSS)
 - [e] Introduction to Naval Engineering, Second Edition
 - [f] NSTM S0986-GX-STM-020/CH220V2R8, Boiler Water/Feedwater Test and Treatment
-

114.1 Define the following terms as applied to boilers:

- a. Combustion [ref. a, ch. 2]
- b. Operating pressure [ref. b, ch. 15]
- c. Superheated steam [ref. b, app. I]
- d. Desuperheated steam [ref. b, app. I]
- e. Saturated steam [ref. b, app. I]
- f. Design pressure [ref. b, ch. 15]
- g. Conduction [ref. e, ch. 3]
- h. Radiation [ref. e, ch. 3]
- i. Convection [ref. e, ch. 3]
- j. Shrink and swell [ref. c, sec. 4]
- k. Atomization [ref. b, app. I]
- l. Sensible heat [ref. a, ch. 2]
- m. Latent heat [ref. a, ch. 2]
- n. Feed water [ref. b, app. I]
- o. Boiler load [ref. b, app. I]

(Signature and Date)

.2 State the protective function of each of the following:

- a. Safety valves [ref. b, ch. 16]
- b. Refractory [ref. c, sec. 2]
- c. Expansion joint [ref. b, app. I]
- d. Superheater protection system [ref. c, sec. 4]
- e. Steam smothering system [ref. b, ch. 4]
- f. Shutters [ref. c, sec. 4]
- g. Fuel oil quick closing valve [ref. c, sec. 4]
- h. Safety shutoff device [ref. c, sec. 3]
- i. Burner root valves [ref. b, ch. 16]

(Signature and Date)

114 **PROPULSION BOILER FUNDAMENTALS (CONT'D)**

114.3 Discuss the following:

- a. Lightoff [ref. d]
- b. Secure [ref. d]
- c. Black smoke [ref. c, sec. 4]
- d. White smoke [ref. c, sec. 4]
- e. Steady steaming/steady-state operation [ref. d]
- f. Panting [ref. b, app. A1-15]
- g. Automatic [ref. b, ch. 16]
- h. Remote manual [ref. b, ch. 16]
- i. Local manual [ref. b, ch. 16]
- j. Steaming hours [ref. f, sec. 27]
- k. Warm-up [ref. b, ch. 7]
- l. Purge [ref. c, sec. 4]
- m. Set point [ref. b, ch. 17]
- n. Bottom/surface/scum blow [ref. c, sec. 4]
- o. Soot blow [ref. c, sec. 4]

(Signature and Date)

- .4 Describe the purpose of surface/bottom/scum blowdowns, special consideration, and required periodicity for accomplishment. [ref. b, ch. 4]

(Signature and Date)

- .5 Describe the purpose of soot blowing, special considerations, and required periodicity for accomplishment. [ref. a, chs. 15, 16]

(Signature and Date)

- .6 Describe the importance of controlling boiler water chemistry. [ref. a, ch. 18]

(Signature and Date)

115 STEAM TURBINE FUNDAMENTALS

References:

- [a] NAVEDTRA 14151, Machinist's Mate 3 & 2 (Surface)
[b] NAVEDTRA 14104, Fireman
-

115.1 State the function of steam turbines. [ref. a, ch. 2]

(Signature and Date)

.2 Discuss how the following components are used:

- a. Throttle poppet valves [ref. a, ch. 2]
- b. Labyrinth seals [ref. a, ch. 2]
- c. Nozzle diaphragms [ref. a, ch. 2]
- d. Thrust bearings [ref. b, ch. 5]
- e. Radial bearings [ref. b, chs. 5, 6]
- f. Stationary turbine blading [ref. a, ch. 2]
- g. Moving turbine blading [ref. a, ch. 2]

(Signature and Date)

.3 State the protective functions of the following: [ref. a, ch. 2]

- a. Overspeed trips
- b. Low lube oil pressure trips
- c. Back pressure trips

(Signature and Date)

.4 Define the following terms as associated with turbines: [ref. a, ch. 2]

- a. Impulse
- b. Reaction
- c. Pressure compounded
- d. Velocity compounded
- e. Pressure/velocity compounded
- f. Axial flow
- g. Double axial flow

(Signature and Date)

115 STEAM TURBINE FUNDAMENTALS (CONT'D)

115.5 State the four ways to classify steam turbines. [ref. a, ch. 2]

(Signature and Date)

116 DIESEL ENGINE FUNDAMENTALS

References:

[a] NAVEDTRA 14077, Engineman 3

116.1 State the applications of diesel engines aboard your ship. [ch. 2]

(Signature and Date)

.2 Define the following terms as applied to diesel engines:

- a. Compression ignition [ch. 2]
- b. Compression ratio [ch. 2]
- c. Four-stroke cycle [ch. 2]
- e. Horsepower [app. I]
- f. Internal combustion [ch. 2]
- g. Jacking [app. I]
- h. Reciprocating [ch. 2]
- i. RPM (engine speed) [ch. 9]
- j. Two-stroke cycle [ch. 2]

(Signature and Date)

.3 Define the following terms used with the diesel engine air system: [ch. 6]

- a. Exhaust stroke
- b. Intake stroke
- c. Scavenging
- d. Turbocharging

(Signature and Date)

.4 Define the following terms used with the diesel engine cooling system: [ch. 7]

- a. Water jacket
- b. Coolant treatment

(Signature and Date)

116 DIESEL ENGINE FUNDAMENTALS (CONT'D)

116.5 Define the following terms used with the diesel engine fuel system:

- a. Combustion [ch. 9]
- b. Fuel injection [ch. 9]
- c. Ignition lag (delay) [ch. 9]
- d. Precombustion [ch. 9]
- e. Priming [app. I]
- f. Fuel oil filter [ch. 9]

(Signature and Date)

.6 State the functions of each of the following primary parts/assemblies of a diesel engine:

- a. Accessory drive assembly [ch. 5]
- b. Block [ch. 3]
- c. Camshaft [ch. 4]
- d. Connecting rod [ch. 4]
- e. Crankcase [ch. 4]
- f. Cylinder head [ch. 3]
- g. Cylinder liners [ch. 3]
- h. Manifold (intake/exhaust) [ch. 6]
- i. Piston [ch. 4]
- j. Sump/oil pan [ch. 3]
- k. Blower/turbocharger [ch. 6]
- l. Valves (intake/exhaust) [ch. 4]

(Signature and Date)

.7 Discuss the different types of diesel engine intake silencers/cleaners. [ch. 6]

(Signature and Date)

.8 Discuss the following starting systems: [ch. 10]

- a. Electric
- b. Air

(Signature and Date)

116 DIESEL ENGINE FUNDAMENTALS (CONT'D)

116.9 Discuss the functions of the following:

- a. Pyrometer [ch. 6]
- b. Fuel control rack [ch. 9]
- c. Remote fuel shutdown [ch. 9]
- d. Manometer [ch. 11]
- e. Crankcase ventilation [ch. 8]
- f. Overspeed trip [ch. 9]
- g. Tachometer [app. I]

(Signature and Date)

117 GAS TURBINE FUNDAMENTALS

References:

- [a] Propulsion Plant Manual (PPM)
[b] NAVEDTRA 14114, Gas Turbine Systems Technician (Electrical) 3/Gas Turbine
 Systems Technician (Mechanical) 3, Vol. 2
-

117.1 Define the following terms:

- a. Axial flow [ref. b, ch. 1]
- b. Aerodynamically coupled [ref. a]
- c. Annular [ref. b, ch. 1]
- d. Bleed Air [ref. b, ch. 1]
- e. Can-Annular [ref. b, ch. 1]
- f. Cooling air [ref. b, ch. 1]
- g. Combustion air [ref. b, ch. 1]
- h. Icing conditions [ref. a]
- i. Inlet guide vane [ref. b, ch. 1]
- j. Relative humidity [ref. a]
- k. Single shaft [ref. b, ch. 1]
- l. Split shaft [ref. b, ch. 1]
- m. Stall [ref. b, app. I]
- n. Variable stator vane [ref. b, ch. 1]

(Signature and Date)

.2 Discuss the basic construction of the following gas turbine engine major components: [ref. b, ch. 1]

- a. Compressor
- b. Combustor
- c. Turbine
- d. Accessory gearbox

(Signature and Date)

117 **GAS TURBINE FUNDAMENTALS (CONT'D)**

117.3 Discuss the purpose of the following gas turbine support systems: [ref. b, ch. 1]

- a. Accessory drive
- b. Fuel oil
- c. Lube oil
- d. Start air

(Signature and Date)

.4 Describe the airflow path through the gas turbine engine to include: [ref. b, ch. 1]

- a. Primary (combustion) air
- b. Secondary (cooling) air

(Signature and Date)

.5 Discuss the following methods used to start a gas turbine engine: [ref. b, ch. 2]

- a. HP air
- b. LP/bleed air
- c. Mechanical

(Signature and Date)

.6 Discuss FOD and the steps taken to prevent its occurrence. [ref. b, ch. 2]

(Signature and Date)

.7 Discuss compressor stall and the means used to prevent its occurrence.
[ref. b, ch. 1]

(Signature and Date)

200 INTRODUCTION TO SYSTEMS

200.1 BASIC BUILDING BLOCKS

In this section, the equipment is broken down into smaller, more comprehensible, functional systems as basic building blocks in the learning process. Each system is written to reflect specific watchstation requirements by identifying the equipment most relevant to one or more designated watchstanders. The less complex systems may be identified and covered quickly or relegated to a lower priority to permit greater emphasis on more significant or complex systems.

200.2 COMPONENTS AND COMPONENT PARTS

For learning purposes each system is disassembled into two levels. Systems have components and components have parts. Do not expect to see every item which appears on a parts list to be in the PQS. Only those items which must be understood for operation/maintenance are listed. Normally a number of very broad (overview) systems are disassembled into their components or parts with the big picture as the learning goal. Items listed as components in such a system may then be analyzed as separate systems and broken down into components and parts. Example: the turbogenerators may be listed as a component of the Ship's Service Electrical Distribution system and then later detailed as an individual system for closer study.

200.3 FORMAT

Each system is organized within the following format:

- It lists the references to be used for study and asks you to explain the function of each system.
- It asks for the static facts of what or where the components and component parts are in relation to the system.
- It directs attention to the dynamics of how the component and component parts operate to make the system function.
- It specifies the parameters that must be immediately recalled.
- It requires study of the relationship between the system being studied and other systems or areas.

200.4 HOW TO COMPLETE

The systems you must complete are listed in the Prerequisites section of each watchstation. When you have mastered one or more systems, contact your Qualifier. The Qualifier will give you an oral examination on each system and, if satisfied you have sufficient knowledge of the system, will sign the appropriate system line items. You will be expected to demonstrate through oral or written examination a thorough understanding of each system required for your watchstation.

201 SHIP'S SERVICE 60/400 HZ ELECTRICAL DISTRIBUTION SYSTEM

References:

- [a] NSTM S9086-KY-STM-010/CH-320R3, Electric Power Distribution Systems
 - [b] NSTM S9086-KN-STM-010/CH-310R2, Electric Power Generators and Conversion Equipment
 - [c] NSTM S9086-KC-STM-010/CH-300R5, Electric Plant-General
 - [d] Propulsion Plant Manual (PPM)
 - [e] Engineering Operational Sequencing System (EOSS)
-

201.1 SYSTEM COMPONENTS AND COMPONENT PARTS

Referring to a standard print of this system or the actual equipment, identify the following system components and component parts and discuss the designated items for each:

- A. What is its function?
- B. Where is it located?
- C. What are the sources of power?
- D. What are the modes of operation or control?
- E. What are the safety/protective devices for this component/component part?
- F. What protection is provided by this component/component part?

Questions

- | | | |
|---------|--|-------------|
| 201.1.1 | Ships service 60/400 Hz distribution system [ref. c, ch. 1] | A |
| .2 | Prime mover [ref. b, sec. 1] | A B D E |
| .3 | Ship's service generator/generator circuit breaker [ref. b, sec. 1] | A B D E F |
| .4 | Switchboard [ref. a, sec. 1] | A B C D E |
| .5 | Emergency generator/emergency switchboards [ref. a, sec. 1] | A B C D E |
| .6 | Bus ties/bus tie circuit breakers [ref. a, sec. 1] | A B D E F |
| .7 | Load centers/load center circuit breakers [ref. a, sec. 1] | A B C D E F |
| .8 | Shore power/shore power circuit breakers [ref. a, sec. 1] | A B F |
| .9 | Casualty power [ref. a, sec. 1] | A |
| .10 | 400 Hz static frequency converters/motor generator sets [ref. a, sec. 1] | A B C |

(Signature and Date)

201 SHIP'S SERVICE 60/400 Hz ELECTRICAL DISTRIBUTION SYSTEM (CONT'D)

201.2 PRINCIPLES OF OPERATION

201.2.1 How do the components work together to achieve the system's function?
[refs. a, sec. 1; ref. b, sec. 1]

(Signature and Date)

.2 List the engineering plant equipment that is supplied with power via an ABT.
[ref. a, sec. 1; ref. d]

(Signature and Date)

.3 Discuss the requirements for starting, paralleling, and stopping ship's service and
emergency generators? [ref. e]

(Signature and Date)

201.3 PARAMETERS/OPERATING LIMITS - None to be discussed.

201.4 SYSTEM INTERFACE - None to be discussed.

201.5 SAFETY PRECAUTIONS- None to be discussed.

202 PROPULSION DRIVE TRAIN SYSTEM

References:

- [a] NAVEDTRA 14151, Machinist's Mate, 3 & 2 (Surface)
 - [b] NAVEDTRA 14077, Engineman 3
 - [c] NAVEDTRA 14113, Gas Turbine Systems Technician (Electrical) 3/Gas Turbine Systems Technician (Mechanical) 3, Vol. 1
 - [d] Propulsion Operating Guide (POG)
 - [e] Propulsion Plant Manual (PPM)
 - [f] Engineering Operational Sequencing System (EOSS)
-

202.1 SYSTEM COMPONENTS AND COMPONENT PARTS

Referring to a standard print of this system or the actual equipment, identify the following system components and component parts and discuss the designated items for each:

- A. What is its function?
- B. Where is it located?

Questions

- | | | |
|---------|---|-----|
| 202.1.1 | Clutch [ref. b, ch. 12; ref. c, ch. 8] | A B |
| .2 | Main reduction gear/IFVG [ref. b, ch. 12; ref. f] | A B |
| .3 | Main thrust bearing [ref. a, ch. 3] | A B |
| .4 | Shafting [ref. a, ch. 3] | A B |
| .5 | Line shaft bearings [ref. a, ch. 3] | A B |
| .6 | Shaft seals [ref. a, ch. 3] | A B |
| .7 | Stern tube bearing [ref. a, ch. 3] | A B |
| .8 | Strut bearing [ref. a, ch. 3] | A B |
| .9 | Propeller [ref. a, ch. 3] | A B |
| .10 | Shaft turning gear [ref. a, ch. 3] | A B |
| .11 | Brake/locking device [ref. a, ch. 3] | A B |

(Signature and Date)

202.2 PRINCIPLES OF OPERATION

- 202.2.1 How do the components work together to achieve the system's function?
[ref. a, ch. 3; ref. e]

(Signature and Date)

202 PROPULSION DRIVE TRAIN SYSTEM (CONT'D)

202.3 PARAMETERS/OPERATING LIMITS

202.3.1 State the operating limits for the following: (as applicable) [ref. d thru f]

- a. Maximum shaft rpm with one shaft locked
- b. Maximum shaft rpm with one shaft trailing
- c. Shaft brake permissives

(Signature and Date)

202.4 SYSTEM INTERFACE

202.4.1 List the systems required to be in operation prior to propulsion shaft rotation. [ref. f]

(Signature and Date)

202.5 SAFETY PRECAUTIONS

202.5.1 What safety precautions apply to following: [ref. a, ch. 3]

- a. Locking and unlocking the shaft
- b. Engaging and disengaging the turning gear
- c. Opening the MRG casing
- d. Inflating the shaft seal

(Signature and Date)

.2 What safety precautions and time limitations apply to shaft rotation following gas turbine startup? [ref. f]

(Signature and Date)

.3 What safety precautions and time limitations apply to rotating the shaft following a stop shaft condition for steam propulsion ships? [ref. a, ch. 7]

(Signature and Date)

203 MAIN LUBE OIL SYSTEM

References:

- [a] NAVEDTRA 14151, Machinist's Mate 3 & 2 (Surface)
 - [b] NAVEDTRA 14115, Gas Turbine Systems Technician (Mechanical) 2
 - [c] Propulsion Operating Guide (POG)
 - [d] Propulsion Plant Manual (PPM)
 - [e] Engineering Operational Sequencing System (EOSS)
 - [f] NAVEDTRA 14114, Gas Turbine Systems Technician (Electrical) 3/Gas Turbine Systems Technician (Mechanical) 3, Vol. 2
-

203.1 SYSTEM COMPONENTS AND COMPONENT PARTS

Referring to a standard print of this system or the actual equipment, identify the following system components and component parts and discuss the designated items for each:

- A. What is its function?
- B. Where is it located?

Questions

- | | | |
|---------|---|-----|
| 203.1.1 | Sump [ref. a, ch. 4; ref. b, ch. 4; ref. f, ch. 5] | A B |
| .2 | Service pumps (attached/standby/emergency)
[ref. a, ch. 4; ref. b, ch. 4; ref. f, ch. 5] | A B |
| .3 | Coast down pump [ref. b, ch. 4] | A B |
| .4 | Unloading valve [ref. a, ch. 4; ref. b, ch. 4; ref. d; ref. f, ch. 5] | A B |
| .5 | Strainer/filter [ref. a, ch. 4; ref. b, ch. 4; ref. d; ref. f, ch. 5] | A B |
| .6 | Cooler [ref. a, ch. 4; ref. b, ch. 4; ref. d; ref. f, ch. 5] | A B |
| .7 | Purifier/heater [ref. a, ch. 4; ref. b, ch. 4; ref. d;] | A B |
| .8 | Sight flow indicators [ref. a, ch. 4; ref. b, ch. 4; ref. d] | A B |
| .9 | Storage/settling tanks [ref. a, ch. 4; ref. b, ch. 4; ref. d] | A B |
| .10 | Thermometers [ref. b, ch. 4; ref. d] | A B |

(Signature and Date)

203.2 PRINCIPLES OF OPERATION

- 203.2.1 How do the components work together to achieve the system's function?
[ref. a, ch. 4; ref. b, ch. 4; ref. d; ref. f, ch. 5]

(Signature and Date)

203 MAIN LUBE OIL SYSTEM (CONT'D)

203.2.2 What is the functional relationship between the emergency, standby, and attached/coast down lube oil pumps? [ref. a, ch. 4; ref. b, ch. 4; ref. d; ref. f, ch. 5]

(Signature and Date)

203.3 PARAMETERS/OPERATING LIMITS

For the items listed, answer the following questions: [refs. c thru e]

A. What is the normal operating value?

203.3.1 Lube oil pressure
.2 Lube oil cooler outlet temperature

Questions

A
A

(Signature and Date)

203.4 SYSTEM INTERFACE – None to be discussed.

203.5 SAFETY PRECAUTIONS– None to be discussed.

204 FUEL OIL FILLING, TRANSFER, STORAGE, AND BALLAST SYSTEM

References:

- [a] NSTM S9086-T8-STM-010/CH-593R4, Pollution Control
 - [b] NSTM S9086-SN-STM-010/CH-541R2, Ship Fuel and Fuel Systems
 - [c] Propulsion Operating Guide (POG)
 - [d] Engineering Operational Sequencing System (EOSS)
-

204.1 SYSTEM COMPONENTS AND COMPONENT PARTS

Referring to a standard print of this system or the actual equipment, identify the following system components and component parts and discuss the designated items for each:

- A. What is its function?
- B. Where is it located?

Questions

- | | | |
|---------|---|-----|
| 204.1.1 | Fuel oil fill and transfer piping and valves [ref. b, sec. 4] | A |
| .2 | Fuel oil storage tanks [ref. b, sec. 3] | A |
| .3 | Fuel oil transfer pump [refs. c, d] | A B |
| .4 | Fuel oil purifier [ref. b, sec. 9] | A B |
| .5 | Automated seawater compensating system [ref. b, sec. 3] | A |
| .6 | Ballast tank [ref. b, sec. 3] | A |
| .7 | Fuel oil stripping system [ref. b, sec. 3] | A |

(Signature and Date)

204.2 PRINCIPLES OF OPERATION

- 204.2.1 How do the components work together to achieve the system's function? [refs. c, d]

(Signature and Date)

- .2 Discuss the two major fuels used aboard naval ships: [refs. c, d]
 - a. F76/DFM
 - b. F44/JP5

(Signature and Date)

204 FUEL OIL FILLING, TRANSFER, STORAGE, AND BALLAST SYSTEM (CONT'D)

204.2.3 Discuss the reasons for ballasting. [refs. b, sec. 4]

(Signature and Date)

204.3 PARAMETERS/OPERATING LIMITS

204.3.1 Discuss fuel consumption versus speed and plant configuration. [ref. c]

(Signature and Date)

.2 What is the total fuel storage capacity of the ship? [refs. c, d]

(Signature and Date)

204.4 SYSTEM INTERFACE

204.4.1 How does this system interface with the following: [refs. c, d]

- a. Ballasting system
- b. Fuel oil stripping system
- c. Fuel oil service system

(Signature and Date)

204.5 SAFETY PRECAUTIONS

204.5.1 What safety precautions apply to fueling ships, boats, and aircraft?
[ref. a, sec. 3; refs. c, d]

(Signature and Date)

205 **COMPRESSED AIR SYSTEM**

References:

[a] NAVEDTRA 14076, Engineman 2
[b] NSTM S9086-SY-STM-010/CH-551R2, Compressed Air Plants and Systems
[c] Engineering Operational Sequencing System (EOSS)

205.1 SYSTEM COMPONENTS AND COMPONENT PARTS

Referring to a standard print of this system or the actual equipment, identify the following system components and component parts and discuss the designated items for each:

- A. What is its function?
- B. Where is it located?

Questions

205.1.1	Compressors (HP/MP/LP) [ref. a, ch. 14; ref. b, sec. 2; ref. c]	A B
.2	Air dehydrators (Type I/II) [ref. a, ch. 14; ref. b, sec. 1]	A
.3	Priority valves [ref. b, sec. 2]	A
.4	Air flasks [ref. a, ch. 14; ref. b, sec. 2]	A

(Signature and Date)

205.2 PRINCIPLES OF OPERATION

- 205.2.1 How do the components work together to achieve the system's function?
[ref. a, ch. 14; ref. b, sec. 2]

(Signature and Date)

- .2 What are typical end uses of HP/MP/LP, control, and dry air? [ref. b, sec. 2; ref. c]

(Signature and Date)

205.3 PARAMETERS/OPERATING LIMITS – None to be discussed.

205.4 SYSTEM INTERFACE– None to be discussed.

205 COMPRESSED AIR SYSTEM (CONT'D)

205.5 SAFETY PRECAUTIONS

205.5.1 What safety precautions apply to HP air system isolation? [ref. b, sec. 14]

(Signature and Date)

206 STEERING SYSTEM

References:

- [a] NSTM S9086-TA-STM-010/CH-562R2, Surface Ship Steering Systems
 [b] Propulsion Plant Manual (PPM)
 [c] Planned Maintenance System (PMS), Maintenance Index Page (MIP) 5600
-

206.1 SYSTEM COMPONENTS AND COMPONENT PARTS

Referring to a standard print of this system or the actual equipment, identify the following system components and component parts and discuss the designated items for each:

- A. What is its function?
- B. Where is it located?
- C. What are the sources of power?
- D. What is the effect on system operation if this component fails?

Questions

- | | | |
|---------|---|---------|
| 206.1.1 | Transmission equipment [ref. a, sec. 5] | A |
| a. | Synchro transmitter | A B C D |
| b. | Steering control cable selector switches | A B C D |
| c. | Steering control cables | A B D |
| d. | Synchro receiver | A B C D |
| e. | Trickwheel | A B D |
| .2 | Control unit [ref. a, sec. 5; ref. b] | A |
| a. | Differential | A B D |
| b. | Follow-up linkage | A B D |
| c. | Transfer valve | A B D |
| .3 | Power unit [ref. a, sec. 4; ref. b] | A |
| a. | Steering motors | A B C D |
| b. | Steering pumps | A B D |
| c. | Emergency (hand) pump | A B D |
| d. | Block and tackle | A B |
| .4 | Ram unit [ref. a, sec. 4; ref. b] | A |
| a. | Ram | A B D |
| b. | Rudder linkage | A B D |
| d. | Copper crush blocks | A B |
| e. | Steel stop blocks | A B |
| .5 | Indicating equipment [ref. a, sec. 5; ref. b] | A |
| a. | Remote reading indicators | A B C D |

(Signature and Date)

206 STEERING SYSTEM (CON'TD)

206.2 PRINCIPLES OF OPERATION

206.2.1 How do the components work together to achieve the system's function?
[ref. a, sec. 8; ref. b]

(Signature and Date)

.2 Discuss the procedures and requirements for conducting steering checks. [ref. c]

(Signature and Date)

206.3 PARAMETERS/OPERATING LIMITS– None to be discussed.

206.4 SYSTEM INTERFACE– None to be discussed.

206.5 SAFETY PRECAUTIONS – None to be discussed.

207 GYROCOMPASS SYSTEM

References:

- [a] NAVEDTRA 14120, Interior Communications Electrician, Vol. 1
 [b] NSTM S9086-NZ-STM-010/CH-420R1, Navigation Systems, Equipment and Aids
 [c] Ships Information Book (SIB)
-

207.1 SYSTEM COMPONENTS AND COMPONENT PARTS

Referring to a standard print of this system or the actual equipment, identify the following system components and component parts and discuss the designated items for each:

- A. What is its function?
 B. Where is it located?

Questions

- | | | |
|---------|---|-----|
| 207.1.1 | Master gyrocompass [ref. a, ch. 4; ref. c] | A B |
| .2 | Auxiliary gyrocompass [ref. a, ch. 4; ref. c] | A B |
| .3 | Battery backup [ref. b, sec. 5] | A B |

(Signature and Date)

207.2 PRINCIPLES OF OPERATION

- 207.2.1 How do the components work together to achieve the system's function?
 [ref. a, ch. 4; ref. b; sec. 5]

(Signature and Date)

207.3 PARAMETERS/OPERATING LIMITS

- 207.3.1 What are the effects and time required for fast-settle versus normal-settle in gyrocompass startup? [ref. a, ch. 4; ref. b, sec. 5]

(Signature and Date)

207 GYROCOMPASS SYSTEM (CONT'D)

207.4 SYSTEM INTERFACE

207.4.1 How does the loss of ship's electrical power affect the operation of this system?
[ref. a, ch. 4]

(Signature and Date)

.2 How does this system interface with the following: [ref. b, ch. 5]

- a. Fire control system
- b. Navigation system
- c. Degaussing

(Signature and Date)

207.5 SAFETY PRECAUTIONS – None to be discussed.

208 **PROPULSION BOILER SYSTEM**

References:

[a]	NAVEDTRA 14151, Machinist's Mate 3 & 2 (Surface)
[b]	NAVEDTRA 14104, Fireman
[c]	Engineering Operational Sequencing System (EOSS)
[d]	NAVSEA Technical Publication S0400-AD-URM-010/TUM, Tag-out Users Manual

208.1 SYSTEM COMPONENTS AND COMPONENT PARTS

Referring to a standard print of this system or the actual equipment, identify the following system components and component parts and discuss the designated items for each:

A. What is its function?

		<u>Questions</u>
208.1.1	Headers [ref. a, ch. 15]	A
.2	Economizer [ref. a, ch. 15]	A
.3	Steam drum [ref. a, ch. 15]	A
.4	Superheater [ref. a, ch. 15]	A
.5	Desuperheater [ref. a, ch. 15]	A
.6	Generating tubes [ref. a, ch. 15]	A
.7	Downcomers [ref. a, ch. 15]	A
.8	Water drum [ref. a, ch. 15]	A
.9	Boiler safety valves [ref. a, ch. 16]	A
.10	Boiler water gage glass [ref. b, ch. 4]	A
.11	Furnace [ref. b, ch. 4]	A
.12	Air casing [ref. b, ch. 4]	A
.13	Surface blow valves and piping [ref. b, ch. 4]	A
.14	Steam drum internals [ref. b, ch. 4]	A
.15	Bottom blow valves and piping [ref. b, ch. 4]	A
.16	Soot blowers [ref. b, ch. 4]	A
.17	Stacks and uptakes [ref. b, ch. 4]	A
.18	Burner assembly [ref. b, ch. 4]	A
.19	ABC system [ref. a, ch. 17]	A
.20	Air lock system [ref. a, ch. 17]	A
.21	Combustion air system [ref. b, ch. 4]	A

(Signature and Date)

208 PROPULSION BOILER SYSTEMS (CONT'D)

208.2 PRINCIPLES OF OPERATION

- 208.2.1 How do the components work together to achieve the system's function?
[ref. b, ch. 4]

(Signature and Date)

- .2 Using a diagram of this system, show the path of water and steam flow from the economizer thru the boiler to the superheater and desuperheater outlets.
[ref. b, ch. 4]

(Signature and Date)

208.3 PARAMETERS/OPERATING LIMITS – None to be discussed.

208.4 SYSTEM INTERFACE

- 208.4.1 How does this system interface with the main engines and ship's service turbogenerator systems? [refs. b, ch. 3; ref. c]

(Signature and Date)

- .2 How does the ABC system interface with the following systems:
[ref. a, ch. 17; ref. b, chs. 3 thru 5]

- a. Combustion air
- b. Fuel oil service
- c. Main feed
- d. Control air

(Signature and Date)

208.5 SAFETY PRECAUTIONS

- 208.5.1 What safety precautions apply to:
- a. Lighting off a boiler [ref. a, ch. 7]
 - b. Isolating a boiler steam drum, water drum, or firebox for maintenance
[ref. a, chs. 7, 8; ref. d, app. G]

(Signature and Date)

209 STEAM PROPULSION TURBINE SYSTEM

References:

- [a] NAVEDTRA 14151, Machinist's Mate 3 & 2 (Surface)
 [b] NSTM S9086-G9-STM-010/CH-231R4, Propulsion and SSTG Steam Turbines
 [c] Propulsion Operating Guide (POG)
-

209.1 SYSTEM COMPONENTS AND COMPONENT PARTS

Referring to a standard print of this system or the actual equipment, identify the following system components and component parts and discuss the designated items for each: [ref. a, ch. 2; ref. c, sec. 2]

- A. What is its function?
 B. Where is it located?

Questions

- | | | |
|---------|-----------------------------|-----|
| 209.1.1 | HP turbine | A B |
| .2 | LP turbine | A B |
| .3 | Astern turbine elements | A B |
| .4 | Gland sealing steam system] | A |

 (Signature and Date)

209.2 PRINCIPLES OF OPERATION

- 209.2.1 Using a diagram of this system, show the path of steam through the HP, LP, and astern turbine elements. [ref. a, ch. 2]

 (Signature and Date)

- .2 Describe the procedure for stopping the shaft when underway.
 [ref. a, ch. 3; ref. c]

 (Signature and Date)

209.3 PARAMETERS/OPERATING LIMITS— None to be discussed.

209 STEAM PROPULSION TURBINE SYSTEM (CONT'D)

209.4 SYSTEM INTERFACE

209.4.1 How do the following outside influences affect the operation of this system: [ref. c]

- a. Variations in gland sealing steam system pressure
- b. Variations in main condenser vacuum

(Signature and Date)

209.5 SAFETY PRECAUTIONS – None to be discussed.

210 MAIN STEAM SYSTEM

References:

- [a] NAVEDTRA 14104, Fireman
 - [b] NAVEDTRA 14151, Machinist's Mate 3 & 2 (Surface)
 - [c] Engineering Operational Sequencing System (EOSS)
 - [d] NSTM S9086-G9-STM-010/CH231R4, Propulsion and SSTG Steam Turbines
 - [e] NAVSEA Technical Publication S0400-AD-URM-010/TUM, Tag-out Users Manual
-

210.1 SYSTEM COMPONENTS AND COMPONENT PARTS

Referring to the EOSS diagram or the actual equipment, identify the following system components and component parts and discuss the designated items for each:

A. What is its function?

Questions

- | | | |
|---------|--|---|
| 210.1.1 | Boiler main steam stop valves [ref. a, ch. 16] | A |
| .2 | Boiler main stop guarding valves [ref. a, ch. 16] | A |
| .3 | Bulkhead stop valves [ref. c] | A |
| .4 | Main engine ahead guarding valve [ref. a, ch. 2] | A |
| .5 | Ahead throttle valve [ref. a, ch. 2] | A |
| .6 | Main engine astern guarding valve [ref. c] | A |
| .7 | Astern throttle valve [ref. a, ch. 10] | A |
| .8 | Main/aux steam warm-up and bypass valves [ref. b, ch. 7] | A |
| .9 | Root steam valves to end users [ref. c] | A |
| .10 | System cross-connect valves [ref. b, ch. 7] | A |
| .11 | Main steam strainer [ref. d, sec. 2] | A |

(Signature and Date)

210.2 PRINCIPLES OF OPERATION

- 210.2.1 How do the components work together to achieve the system's function?
[ref. b, ch. 17]

(Signature and Date)

- .2 Using a diagram of this system, show the path of steam from the boiler superheater to the end users. [ref. c]

(Signature and Date)

210 MAIN STEAM SYSTEM (CONT'D)

210.3 PARAMETERS/OPERATING LIMITS – None to be discussed.

210.4 SYSTEM INTERFACE

210.4.1 How does this system interface with the following systems/components:
[ref. a]

- a. Auxiliary steam systems [chs. 3, 10]
- b. Main engine [chs. 3, 12]
- c. SSTG [chs. 3, 12]
- d. Auxiliary turbine [chs. 2, 3]

(Signature and Date)

210.5 SAFETY PRECAUTIONS

210.5.1 What safety precautions apply to system isolation? [ref. c; ref. e, app. G]

(Signature and Date)

211 **AUXILIARY STEAM SYSTEM**

References:

- [a] OPNAVINST 3120.32C (Change 4), Standard Organization and Regulations of the U. S. Navy (SORM)
 - [b] NAVEDTRA 14151, Machinist's Mate, 3 & 2 (Surface)
 - [c] Engineering Operational Sequencing System (EOSS)
 - [d] NAVSEA Technical Publication S0400-AD-URM-010/TUM, Tag-out Users Manual
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211.1 SYSTEM COMPONENTS AND COMPONENT PARTS

Referring to a standard print of this system or the actual equipment, identify the following system components and component parts and discuss the designated items for each: [ref. b, ch. 16]

A. What is its function?

		<u>Questions</u>
211.1.1	Boiler auxiliary steam stop	A
.2	Boiler auxiliary guarding valve	A
.3	Steam reducing station	A
.4	System cross-connect valves	A
.5	Augmenting system station	A

(Signature and Date)

211.2 PRINCIPLES OF OPERATION

211.2.1 How does this system support the following end users: [ref. b, ch. 16]

- a. Auxiliary turbines
- b. Soot blowers
- c. Reducing stations
- d. Augmenting stations/valves

(Signature and Date)

- .2 Using a diagram of the system, show the path of steam from the desuperheater outlet to the end users. [ref. c]

(Signature and Date)

211.3 PARAMETERS/OPERATING LIMITS – None to be discussed.

211 AUXILIARY STEAM SYSTEM (CONT'D)

211.4 SYSTEM INTERFACE

211.4.1 How does this system interface with the following: [ref. c]

- a. 150 psi auxiliary steam system
- b. Auxiliary exhaust steam system

(Signature and Date)

211.5 SAFETY PRECAUTIONS

211.5.1 What safety precautions apply to system isolation?
[ref. a, ch. 1; ref. d, app. G]

(Signature and Date)

212 150 PSI AUXILIARY STEAM SYSTEM

References:

- [a] NAVEDTRA 14151, Machinist's Mate 3 & 2 (Surface)
 - [b] NSTM S9086-RK-STM-010/CH-505, Piping Systems
 - [c] Propulsion Operating Guide (POG)
 - [d] NAVSEA Technical Publication S0400-AD-URM-010/TUM, Tag-out Users Manual
 - [e] Engineering Operational Sequencing System (EOSS)
-

212.1 SYSTEM COMPONENTS AND COMPONENT PARTS

Referring to a standard print of this system or the actual equipment, identify the following system components and component parts and discuss the designated items for each: [ref. b, sec. 2]

A. What is its function?

- | | | |
|---------|---|--|
| 212.1.1 | Reducing stations | |
| .2 | In-line desuperheater | |
| .3 | Shore steam connection and cut-out valves | |

Questions

A
A
A

(Signature and Date)

212.2 PRINCIPLES OF OPERATION

- 212.2.1 How do the components work together to achieve the system's function?
[ref. a, ch. 8; ref. e]

(Signature and Date)

212.3 PARAMETERS/OPERATING LIMITS – None to be discussed.

212.4 SYSTEM INTERFACE

- 212.4.1 How does loss of auxiliary steam affect the operation of this system? [ref. e]

(Signature and Date)

212 150 PSI AUXILIARY STEAM SYSTEM (CONT'D)

212.4.2 How does this system interface with the following end users: [refs. c, e]

- a. Ship service steam systems (50 & 100 psi)
- b. Distilling plants
- c. Ship's whistle
- d. Boiler steam smothering system
- e. Boiler steam atomizing system
- f. Superheater protection steam system
- g. Lube oil heating and purification system
- h. Main and auxiliary air ejectors
- i. Gland sealing steam system
- j. Augmenting steam system

(Signature and Date)

212.5 SAFETY PRECAUTIONS

212.5.1 What safety precautions apply to system isolation? [ref. d, app. G]

(Signature and Date)

213 AUXILIARY EXHAUST STEAM SYSTEM

References:

- [a] NSTM S9086-HZ-STM-020/CH-255R1, Vol. 2, Feed Water System and Apparatus - Deaerating Feed Tanks
 - [b] NSTM S9086-HY-STM-010/CH-354R2, Condensers, Heat Exchangers and Air Ejectors
 - [c] NAVEDTRA 14151, Machinist's Mate 3 & 2 (Surface)
 - [d] Propulsion Operating Guide (POG)
 - [e] NAVSEA Technical Publication S0400-AD-URM-010/TUM, Tag-out Users Manual
 - [f] Engineering Operational Sequencing System (EOSS)
-

213.1 SYSTEM COMPONENTS AND COMPONENT PARTS

Referring to a standard print of this system or the actual equipment, identify the following system components and component parts and discuss the designated items for each:

A. What is its function?

		<u>Questions</u>
213.1.1	Combination exhaust relief valve [ref. c, ch. 5]	A
.2	Atmospheric exhaust unloader valve [ref. b, sec. 2]	A
.3	Unloading valves to condensers [ref. b, sec. 2]	A
.4	Auxiliary exhaust augmenting valves [ref. f]	A

(Signature and Date)

213.2 PRINCIPLES OF OPERATION

- 213.2.1 How do the components work together to achieve the system's function?
[ref. d]

(Signature and Date)

213 AUXILIARY EXHAUST STEAM SYSTEM (CONT'D)

213.2.2 Using a diagram of this system, show the path of auxiliary exhaust from the auxiliary equipment to the following: [ref. f]

- a. DFT
- b. Evaporators
- c. Main condenser
- d. Auxiliary condensers

(Signature and Date)

213.3 PARAMETERS/OPERATING LIMITS – None to be discussed.

213.4 SYSTEM INTERFACE

213.4.1 How does this system interface with the following:

- a. DFT [ref. c, ch. 6]
- b. Distilling plant [ref. c, ch. 9]
- c. Main and auxiliary condensers [ref. c, ch. 6]
- d. Boiler superheater protection system [ref. f]

(Signature and Date)

213.5 SAFETY PRECAUTIONS

213.5.1 What safety precautions apply to system isolation? [ref. e, app. G; ref. f]

(Signature and Date)

214 MAIN FEED SYSTEM

References:

- [a] NAVEDTRA 14151, Machinist's Mate, 3 & 2 (Surface)
 - [b] NSTM S9086-HZ-STM-020/CH-255R1, Vol. 2, Feed Water System and Apparatus - Deaerating Feed Tanks
 - [c] Propulsion Operating Guide (POG)
 - [d] NAVSEA Technical Publication S0400-AD-URM-010/TUM, Tag-out Users Manual
 - [e] Engineering Operational Sequencing System (EOSS)
-

214.1 SYSTEM COMPONENTS AND COMPONENT PARTS

Referring to a standard print of this system or the actual equipment, identify the following system components and component parts and discuss the designated items for each:

- A. What is its function?
- B. Where is it located?

Questions

- | | | |
|---------|---|-----|
| 214.1.1 | DFT [ref. a, ch. 6; ref. e] | A B |
| .2 | MFBPs [ref. a, ch. 6; ref. b sec. 2] | A |
| .3 | MFP [ref. b, sec. 2] | A |
| .4 | Economizer [ref. a, ch. 6] | A |
| .5 | Feed water control valve [ref. b, sec. 2] | A |

(Signature and Date)

214.2 PRINCIPLES OF OPERATION

- 214.2.1 How do the components work together to achieve the system's function? [ref. c]

(Signature and Date)

- .2 Using a diagram of this system, show the path of feedwater from the DFT outlet to the economizer outlet. [ref. c]

(Signature and Date)

- 214.3 PARAMETERS/OPERATING LIMITS – None to be discussed.

- 214.4 SYSTEM INTERFACE– None to be discussed.

214 MAIN FEED SYSTEM (CONT'D)

214.5 SAFETY PRECAUTIONS

214.5.1 What safety precautions apply to system isolation? [ref. d, app. G]

(Signature and Date)

215 MAIN CONDENSATE SYSTEM

References:

- [a] NAVEDTRA 14151, Machinist's Mate 3 & 2 (Surface)
 - [b] Propulsion Operating Guide (POG)
 - [c] Engineering Operational Sequencing System (EOSS)
-

215.1 SYSTEM COMPONENTS AND COMPONENT PARTS

Referring to a standard print of this system or the actual equipment, identify the following system components and component parts and discuss the designated items for each:

- A. What is its function?
- B. Where is it located?

Questions

- | | | |
|---------|--|-----|
| 215.1.1 | Main condenser [ref. a, ch. 6; refs. b, c] | A B |
| .2 | Main condensate pumps [ref. a, ch. 5] | A B |
| .3 | Main air ejector condensers [ref. a, ch. 6; ref. b] | A |
| .4 | Main circulating pump [ref. a, ch. 6; refs. b, c] | A |
| .5 | Main condenser scoop injection [ref. a, ch. 6; refs. b, c] | A |
| .6 | Salinity indicators [ref. a, ch. 6; refs. b, c] | A B |

(Signature and Date)

215.2 PRINCIPLES OF OPERATION

- 215.2.1 How do the components work together to achieve the system's function?
[ref. a, ch. 6]

(Signature and Date)

- .2 Using a diagram of the system, show the path of: [ref. c]
 - a. Seawater from the sea suction valves through the main condenser and lube oil cooler to the overboard discharge valve
 - b. Condensate from the main condenser to the DFT

(Signature and Date)

215 MAIN CONDENSATE SYSTEM (CONT'D)

215.3 PARAMETERS/OPERATING LIMITS – None to be discussed.

215.4 SYSTEM INTERFACE– None to be discussed.

215.5 SAFETY PRECAUTIONS

215.5.1 State the safety precautions associated with working on the main condenser.
[ref. a, ch. 6]

(Signature and Date)

216 STEAM FUEL OIL SERVICE SYSTEM

References:

- [a] NAVEDTRA 14151, Machinist's Mate, 3 & 2 (Surface)
 - [b] NSTM S9086-RK-STM-010/CH-505, Piping Systems
 - [c] Propulsion Operating Guide (POG)
 - [d] Engineering Operational Sequencing System (EOSS)
 - [e] NSTM S9086-SN-STM-010/CH-541R2, Ship Fuel and Fuel Systems
 - [f] NAVSEA Technical Publication S0400-AD-URM-010/TUM, Tag-out Users Manual
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216.1 SYSTEM COMPONENTS AND COMPONENT PARTS

Referring to a standard print of this system or the actual equipment, identify the following system components and component parts and discuss the designated items for each:

A. What is its function?

		<u>Questions</u>
216.1.1	Fuel oil service tank [ref. a, app. I; ref. c]	A
.2	Main fuel oil service pump [ref. a, ch. 5; refs. c, d]	A
.3	Port use fuel oil service pump [refs. c, d]	A
.4	Fuel oil pressure unloading [refs. a, d]	A
.5	Fuel oil strainers [ref. b, sec. 3; ref. e, sec. 9]	A
.6	Fuel oil quick-closing valves [refs. a, ch. 17]	A
.7	Fuel oil control valve [refs. a, ch. 17]	A
.8	Burner root valves [refs. c, d]	A
.9	Fuel oil safety shutoff device [ref. a, ch. 16; ref. e]	A
.10	Atomizer assembly [refs. c, d]	A

(Signature and Date)

216.3 PRINCIPLES OF OPERATION

- 216.3.1 How do the components work together to achieve the system's function?
[ref. a, chs. 7, 16; ref. d]

(Signature and Date)

216 STEAM FUEL OIL SERVICE SYSTEM (CONT'D)

216.3.2 Using a diagram of the system, show the path of fuel oil from the service tank through the atomizer assembly and into the boiler furnace. [refs. c, d]

(Signature and Date)

216.4 PARAMETERS/OPERATING LIMITS – None to be discussed.

216.5 SYSTEM INTERFACE – None to be discussed.

216.6 SAFETY PRECAUTIONS

216.6.1 What safety precautions apply to system isolation? [ref. f, app. G]

(Signature and Date)

217 MAIN PROPULSION DIESEL ENGINE SYSTEM

References:

- [a] NSTM S9086-HB-STM-010/CH-233R2, Diesel Engines
 [b] NAVEDTRA 14077, Engineman 3
-

217.1 SYSTEM COMPONENTS AND COMPONENT PARTS

Referring to a standard print of this system or the actual equipment, identify the following system components and component parts and discuss the designated items for each:

A. What is its function?

	<u>Questions</u>
217.1.1 Cylinder block [ref. b, sec. 3]	A
.2 Crankcase/bed plate [ref. b, sec. 3]	A
.3 Cylinder head [ref. b, sec. 3]	A
.4 Cylinder liner [ref. b, sec. 4]	A
.5 Piston [ref. b, sec. 4]	A
.6 Connecting rods [ref. b, sec. 4]	A
.7 Camshaft [ref. b, sec. 4]	A
.8 Intake and exhaust ports/valves [ref. b, sec. 4]	A
.9 Crankshaft [ref. b, sec. 4]	A
.10 Flywheel [ref. b, sec. 4]	A
.11 Turbocharger [ref. b, sec. 6]	A
.12 Starting mechanism (air/electric) [ref. b, sec. 10]	A
.13 Air intake shutdown device [ref. a, ch. 13]	A
.14 Remote fuel shutdown valve [ref. a, ch. 13]	A
.15 Pyrometer (installed/hand-held) [ref. b, sec. 6]	A
.16 Overspeed trip [ref. b, sec. 9]	A
.17 Explosion covers [ref. b, sec. 3]	A
.18 Fuel injectors [ref. b, sec. 9]	A
.19 Governor [ref. b, sec. 9]	A

 (Signature and Date)

217.2 PRINCIPLES OF OPERATION

- 217.2.1 How do the components work together to achieve the system's function?
 [ref. b, sec. 2]

 (Signature and Date)

217 MAIN PROPULSION DIESEL ENGINE SYSTEM (CONT'D)

217.3 PARAMETERS/OPERATING LIMITS – None to be discussed.

217.4 SYSTEM INTERFACE – None to be discussed.

217.5 SAFETY PRECAUTIONS – None to be discussed.

218 DIESEL FUEL OIL SERVICE SYSTEM

References:

- [a] NAVEDTRA 14077, Engineman 3
 [b] Engineering Operational Sequencing System (EOSS)
 [c] NAVSEA Technical Publication S0400-AD-URM-010/TUM, Tag-out Users Manual
-

218.1 SYSTEM COMPONENTS AND COMPONENT PARTS

Referring to a standard print of this system or the actual equipment, identify the following system components and component parts and discuss the designated items for each: [ref. a, ch. 9]

A. What is its function?

		<u>Questions</u>
218.1.1	Duplex strainer	A
.2	Service/standby/hand pumps	A
.3	Fuel oil filter/coalescer	A
.4	Injector pump	A
.5	Fuel injectors	A
.6	Fuel oil supply/return valves	A
.7	Service/day tank	A

 (Signature and Date)

218.2 PRINCIPLES OF OPERATION

218.2.1 Using a diagram of the system, show the path of fuel oil from the service tank back to the service tank. [ref. b]

 (Signature and Date)

218.3 PARAMETERS/OPERATING LIMITS – None to be discussed.

218.4 SYSTEM INTERFACE – None to be discussed.

218.5 SAFETY PRECAUTIONS

218.5.1 What safety precautions apply to system isolation? [ref. c, app. G]

 (Signature and Date)

219 DIESEL LUBE OIL SYSTEM

References:

- [a] Engineering Operational Sequencing System (EOSS)
 [b] NAVEDTRA 14077, Engineman 3
 [c] NAVSEA Technical Publication S0400-AD-URM-010/TUM, Tag-out Users Manual
-

219.1 SYSTEM COMPONENTS AND COMPONENT PARTS

Referring to a standard print of this system or the actual equipment, identify the following system components and component parts and discuss the designated items for each: [ref. b]

A. What is its function?

		<u>Questions</u>
219.1.1	Engine sump [ch. 8]	A
.2	Attached lube oil pump [ch. 8]	A
.3	Standby/priming lube oil pump [ch. 8]	A
.4	Strainer/filter [ch. 8]	A
.5	Lube oil heat exchanger [ch. 8]	A
.6	Distribution piping/passages [ch. 8]	A
.7	Purifier [ch. 9]	A

(Signature and Date)

219.2 PRINCIPLES OF OPERATION

219.2.1 Using a diagram of this system, show the path of lube oil from the engine sump through the lubrication system and back to the sump. [ref. a]

(Signature and Date)

219 DIESEL LUBE OIL SYSTEM (CONT'D)

219.3 PARAMETERS/OPERATING LIMITS

For the items listed, answer the following questions: [ref. a]

A. What are the allowable operating limits?

- 219.3.1 Lube oil header pressure
.2 Lube oil inlet temperature

Questions

A

A

(Signature and Date)

219.4 SYSTEM INTERFACE

- 219.4.1 How do the following outside influences affect the operation of this system:
[ref. b, ch. 8]

a. Contaminated lube oil

(Signature and Date)

219.5 SAFETY PRECAUTIONS

- 219.5.1 What safety precautions apply to system isolation? [ref. c, app. G]

(Signature and Date)

220 DIESEL JACKET WATER COOLING SYSTEM

References:

- [a] NAVEDTRA 14077, Engineman 3
 [b] Engineering Operational Sequencing System (EOSS)
-

220.1 SYSTEM COMPONENTS AND COMPONENT PARTS

Referring to a standard print of this system or the actual equipment, identify the following system components and component parts and discuss the designated items for each: [ref. a, ch. 7]

A. What is its function?

Questions

- | | | |
|---------|-------------------------------|---|
| 220.1.1 | Jacket water circulating pump | A |
| .2 | Expansion tank | A |
| .3 | Jacket water heat exchanger | A |
| .4 | Lube oil heat exchanger | A |
| .5 | Thermostatic valve | A |
| .6 | Engine jacket | A |

 (Signature and Date)

220.2 PRINCIPLES OF OPERATION

- 220.2.1 How do the components work together to achieve the system's function?
 [ref. a, ch. 7]

 (Signature and Date)

- .2 Using a diagram of this system, show the path of the jacket water from the discharge side of the engine jacket water pump and back to the jacket water pump.
 [ref. b]

 (Signature and Date)

220.3 PARAMETERS/OPERATING LIMITS – None to be discussed.

220 DIESEL JACKET WATER COOLING SYSTEM (CONT'D)

220.4 SYSTEM INTERFACE

- 220.4.1 How does the jacket water interface with the MPDE lube oil system?
[ref. a, ch. 7]

(Signature and Date)

220.5 SAFETY PRECAUTIONS

- 220.5.1 What safety precautions must be observed when filling/draining jacket water
systems? [ref. a, ch. 7]

(Signature and Date)

221 DIESEL PROPULSION CONTROL SYSTEM

References:

- [a] Engineering Operational Sequencing System (EOSS)
 - [b] NAVSEA S9202-AE-MMA-010, Machinery Plant Systems Manual for LSD-41 USS Whidbey Island
 - [c] NAVSEA S9234-DJ-GTP-040, Propulsion Plant Manual, MHC-51 Class Machinery/ Ship Control System
 - [d] NAVSEA S9234-DF-GTP-040, Technical Manual, Engineering Plant Controls, MCM-1 Class
-

221.1 SYSTEM COMPONENTS AND COMPONENT PARTS

Referring to a standard print of this system or the actual equipment, identify the following system components and component parts and discuss the designated items for each:

- A. What is its function?
- B. Where is it located?
- C. What are the sources of power?
- D. What are the modes of operation or control?

Questions

- | | | |
|---------|---|---------|
| 221.1.1 | Ship's control console [ref. b, ch. 22; ref. c, ch. 21; ref. d, ch. 26] | A B C D |
| .2 | EOS/MMC/MCC [ref. b, ch. 22; ref. c, ch. 21; ref. d, ch. 24] | A B C D |
| .3 | Local operating station pitch [ref. b, ch. 22] | A B C |
| .4 | LOS/LCP/ERSP [ref. b, ch. 22; ref. c, ch. 22; ref. d, ch. 24] | A B C D |
| .5 | Bell logger/ printer [ref. b, ch. 22; ref. c, ch. 21; ref. d, ch. 25] | A |
| .6 | Uninterruptible power supply (28 VDC power supply) [ref. c, ch. 21] | A B |
| .7 | Engine air control [ref. c, ch. 22] | A |
| .8 | EOT [ref. b, ch. 22; ref. c, ch. 21; ref. d, ch. 26] | A |

(Signature and Date)

221.2 PRINCIPLES OF OPERATION

- 221.2.1 How do the components work together to achieve the system's function?
[ref. a; ref. b, ch. 22; ref. c, ch. 20; ref. d, ch. 24]

(Signature and Date)

221.3 PARAMETERS/OPERATING LIMITS – None to be discussed.

221 DIESEL PROPULSION CONTROL SYSTEM (CONT'D)

221.4 SYSTEM INTERFACE– None to be discussed.

221.5 SAFETY PRECAUTIONS– None to be discussed.

222 CONTROLLABLE PITCH PROPELLER SYSTEM

References:

- [a] NSTM S9086-HP-STM-010/CH245R4, Propellers
 - [b] Propulsion Plant Manual (PPM)
 - [c] Engineering Operational Sequencing System (EOSS)
-

222.1 SYSTEM COMPONENTS AND COMPONENT PARTS

Referring to a standard print of this system or the actual equipment, identify the following system components and component parts and discuss the designated items for each:

- A. What is its function?
- B. Where is it located?

Questions

- | | | |
|---------|--|-----|
| 222.1.1 | Sump [ref. a, sec. 5] | A |
| .2 | Electric/gear driven hydraulic oil pump [ref. a, sec. 5; ref. b] | A B |
| .3 | Hydraulic oil power module [ref. a, sec. 5; ref. b] | A B |
| .4 | Oil distribution box [ref. a, sec. 5; ref. b] | A B |
| .5 | Electro hydraulic servo valve [ref. a, sec. 5; ref. b] | A B |
| .6 | Valve rod [ref. a, sec. 5] | A |
| .7 | Shaft [ref. a, sec. 5] | A |
| .8 | Propeller hub assembly [ref. a, sec. 5] | A |
| .9 | Head tank [ref. a, sec. 5; ref. b] | A B |
| .10 | Lube oil purifier [ref. a, sec. 5] | A |

(Signature and Date)

222.2 PRINCIPLES OF OPERATION

- 222.2.1 How do the components work together to achieve the system's function?
[ref. a, sec. 5]

(Signature and Date)

- .2 Using a block diagram of this system, show the path of power and control oil from the sump tank through the system back to the sump tank. [ref. a, sec. 5]

(Signature and Date)

222 CONTROLLABLE PITCH PROPELLER SYSTEM (CONT'D)

222.3 PARAMETERS/OPERATING LIMITS

222.3.1 Describe the procedure for setting emergency ahead pitch and what are the operating limitations. [ref. a, sec. 5; refs. b, c]

(Signature and Date)

222.4 SYSTEM INTERFACE– None to be discussed.

222.5 SAFETY PRECAUTIONS – None to be discussed.

223 GAS TURBINE AIR INTAKE AND EXHAUST SYSTEM

References:

- [a] NAVEDTRA 14114, Gas Turbine Systems Technician (Electrical) 3/Gas Turbine Systems Technician (Mechanical) 3, Vol. 2
 [b] Propulsion Plant Manual (PPM)
-

223.1 SYSTEM COMPONENTS AND COMPONENT PARTS

Referring to a standard print of this system or the actual equipment, identify the following system components and component parts and discuss the designated items for each:

- A. What is its function?
 B. Where is it located?

Questions

- | | | |
|---------|--|-----|
| 223.1.1 | Engine removal access equipment/fittings [ref. a, ch. 2] | A |
| .2 | Moisture separators [ref. a, ch. 2; ref. b] | A B |
| .3 | Blow-in door [ref. a, ch. 2; ref. b] | A B |
| .4 | Intake duct [ref. a, ch. 2] | A |
| .5 | Anti-icing manifold [ref. a, ch. 2] | A |
| .6 | Module cooling fan/duct [ref. a, ch. 2] | A |
| .7 | Air intake silencing [ref. a, ch. 2] | A |
| .8 | Exhaust duct [ref. a, ch. 2] | A |
| .9 | Exhaust duct silencing section [ref. a, ch. 2] | A |
| .10 | Eductor section [ref. a, ch. 2] | A |

(Signature and Date)

223.2 PRINCIPLES OF OPERATION

- 223.2.1 Using a diagram of this system, show the path of air from the moisture separators to the exhaust eductors. [ref. b]

(Signature and Date)

- .2 Discuss how system components prevent inlet ice formation? [ref. a, ch. 2]

(Signature and Date)

223.3 PARAMETERS/OPERATING LIMITS – None to be discussed.

223 GAS TURBINE AIR INTAKE AND EXHAUST SYSTEM (CONT'D)

223.4 SYSTEM INTERFACE

223.4.1 How does FOD affect the operation of this system? [ref. a, ch. 2]

(Signature and Date)

223.5 SAFETY PRECAUTIONS – None to be discussed.

224 GAS TURBINE ENGINE AND MODULE SYSTEM

References:

- [a] NAVEDTRA 14114, Gas Turbine Systems Technician (Electrical) 3/Gas Turbine Systems Technician (Mechanical) 3, Vol. 2
 [b] Propulsion Plant Manual (PPM)
 [c] Engineering Operational Sequencing System (EOSS)
-

224.1 SYSTEM COMPONENTS AND COMPONENT PARTS

Referring to a standard print of this system or the actual equipment, identify the following system components and component parts and discuss the designated items for each:

- A. What is its function?
 B. What protection is provided by this component/component part?
 C. Where is it located?

Questions

- | | | |
|---------|---|-----|
| 224.1.1 | Base enclosure assembly [ref. a, ch. 2; refs. b, c] | A B |
| .2 | Compressor inlet plenum/screen [ref. a, ch. 2; ref. c] | A B |
| .3 | Compressor [ref. a, ch. 2; ref. b, sec. 1; ref. c] | A |
| .4 | Compressor variable stator vanes [ref. a, ch. 2; ref. c] | A B |
| .5 | Engine bleed air manifolds [ref. a, chs. 2 thru 4; ref. c] | A |
| .6 | Customer bleed air [ref. a, ch. 2; ref. c] | A |
| .7 | Combustor [ref. a, ch. 2; refs. b, c] | A |
| .8 | Gas generator section [ref. a, ch. 2; refs. b, c] | A |
| .9 | Power turbine [ref. a, ch. 2; refs. b, c] | A |
| .10 | Ignition system [ref. a, ch. 2; refs. b, c] | A |
| .11 | High-speed flexible coupling [ref. a, ch. 2; ref. c] | A |
| .12 | Accessory drive assembly [ref. a, ch. 2; ref. c] | A |
| .13 | LOSCA [ref. a, ch. 2; ref. b] | A C |
| .14 | Lube oil supply and scavenge pump [ref. a, ch. 2] | A |
| .15 | Air oil separator [ref. a, ch. 2] | A |
| .16 | Gas turbine bearings/sumps [ref. a, ch. 2; ref. c] | A |
| .17 | Attached fuel oil pump [ref. a, ch. 2] | A |
| .18 | Main fuel control [ref. a, ch. 2] | A |
| .19 | Fuel oil shutdown valves [ref. a, ch. 2] | A |
| .20 | Fuel oil nozzles [ref. a, ch. 2] | A |
| .21 | Power level angle actuator [ref. a, ch. 2] | A |
| .22 | Fire detection and extinguishing system [ref. a, ch. 2; refs. b, c] | A B |
| .23 | Water wash system [ref. a, ch. 2; refs. b, c] | A C |

(Signature and Date)

224 GAS TURBINE ENGINE AND MODULE SYSTEM (CONT'D)

224.2 PRINCIPLES OF OPERATION

- 224.2.1 How do the components work together to achieve the system's function?
[ref. a, ch. 2; ref. c]

(Signature and Date)

- .2 Describe the sequence of events to accomplish the following: [ref. c]

- a. Start gas turbine engine
- b. Normal stop gas turbine engine
- c. Emergency stop gas turbine engine

(Signature and Date)

- .3 Using a diagram of the system show the path of: [ref. a, ch. 2]

- a. Lube oil from the LOSCA through the engine and back to the LOSCA
- b. Fuel oil from the attached fuel pump to the combustor

(Signature and Date)

224.3 PARAMETERS/OPERATING LIMITS– None to be discussed.

224.4 SYSTEM INTERFACE

- 224.4.1 Describe the interface between the main lube oil system and the gas turbine lube oil system. [ref. a, ch. 2; refs. b, c]

(Signature and Date)

224.5 SAFETY PRECAUTIONS – None to be discussed.

225 GAS TURBINE ENGINE FUEL OIL SERVICE SYSTEM

References:

- [a] NAVEDTRA 14114, Gas Turbine Systems Technician (Electrical) 3/Gas Turbine Systems Technician (Mechanical) 3, Vol. 2
 [b] Ship's Propulsion Plant Manual (PPM)
 [c] NSTM S9086-SN-STM-010/CH-541R2 Ship Fuel and Fuel Systems
-

225.1 SYSTEM COMPONENTS AND COMPONENT PARTS

Referring to a standard print of this system or the actual equipment, identify the following system components and component parts and discuss the designated items for each:

- A. What is its function?
 B. Where is it located?
 C. What protection is provided by this component/component part?

Questions

- | | | |
|---------|--|-------|
| 225.1.1 | Service tanks [ref. a, ch. 4; ref. b; ref. c, sec. 5] | A |
| .2 | Service tank cutout valve [ref. b; ref. c, sec. 5] | A B C |
| .3 | Suction/recirculation valves [ref. b] | A B |
| .4 | Duplex strainer [ref. a, ch. 4; ref. b; ref. c, sec. 5] | A B |
| .5 | Service pumps [ref. a, ch. 4; ref. b; ref. c, sec. 5] | A B C |
| .6 | Unloader [ref. b] | A B |
| .7 | Heater [ref. a, ch. 4; ref. b; ref. c, sec. 5] | A B |
| .8 | Filter/coalescer [ref. a, ch. 4; ref. b; ref. c, sec. 5] | A B |
| .9 | Gravity feed tank [ref. b] | A |
| .10 | Emergency trip valve [ref. b; ref. c, sec. 5] | A B C |

(Signature and Date)

225.2 PRINCIPLES OF OPERATION

- 225.2.1 Using a diagram of this system, show the path of fuel oil from the service tank to the emergency trip valve including the gravity feed tank. [ref. a, ch. 4]

(Signature and Date)

225.3 PARAMETERS/OPERATING LIMITS – None to be discussed.

225 GAS TURBINE ENGINE FUEL OIL SERVICE SYSTEM (CONT'D)

225.4 SYSTEM INTERFACE– None to be discussed.

225.5 SAFETY PRECAUTIONS – None to be discussed.

226 GAS TURBINE ENGINE CONTROL SYSTEM

References:

- [a] NAVEDTRA 14114, Gas Turbine Systems Technician (Electrical) 3/Gas Turbine Systems Technician (Mechanical) 3, Vol. 2
 - [b] Propulsion Plant Manual (PPM)
 - [c] Commanding Officer's Standing Orders
-

226.1 SYSTEM COMPONENTS AND COMPONENT PARTS

Referring to a standard print of this system or the actual equipment, identify the following system components and component parts and discuss the designated items for each:

- A. What is its function?
- B. Where is it located?
- C. What are the modes of operation or control?

Questions

- | | | |
|---------|---|-------|
| 226.1.1 | Ship control console [ref. b] | A B C |
| .2 | Propulsion and auxiliary control console or propulsion control console [ref. a, chs. 5 thru 7; ref. b] | A B C |
| .3 | Propulsion local control console, local operating panel, or shaft control unit [ref. a, chs. 5 thru 7; ref. b] | A B C |
| .4 | Electric plant control console [ref. a, chs. 5 thru 7; ref. b] | A B C |
| .5 | Bell/data loggers [ref. a, ch. 9; ref. b] | A |
| .6 | Freestanding electronics enclosure, integrated electronic console, or universal engine controller [ref. a, ch. 2; ref. b] | A B |

(Signature and Date)

226.2 PRINCIPLES OF OPERATION

- 226.2.1 What is the sequence of component involvement to initiate gas turbine engine and pitch control signals from the bridge to the gas turbine engine and OD box? [ref. a, chs. 5 thru 7; ref. b]

(Signature and Date)

226 GAS TURBINE ENGINE CONTROL SYSTEM (CONT'D)

226.2.2 What normal gas turbine shutdown conditions are inhibited by the engaging battle override and how is this addressed in your ship's Restricted Maneuvering Doctrine?
[refs. b, c]

(Signature and Date)

226.3 PARAMETERS/OPERATING LIMITS – None to be discussed.

226.4 SYSTEM INTERFACE– None to be discussed.

226.5 SAFETY PRECAUTIONS - None to be discussed.

300 INTRODUCTION TO WATCHSTATIONS

300.1 INTRODUCTION

The Watchstation section of your PQS is where you get a chance to demonstrate to your Qualifier that you can put the knowledge you have gained in the previous sections to use. It allows you to practice the tasks required for your watchstation and to handle abnormal conditions and emergencies. Before starting your assigned tasks, you must complete the prerequisites that pertain to the performance of that particular task. Satisfactory completion of all prerequisites is required prior to achievement of final watchstation qualification.

300.2 FORMAT

Each watchstation in this section contains:

- A FINAL QUALIFICATION PAGE, which is used to obtain the required signatures for approval and recording of Final Qualification.
- PREREQUISITES, which are items that must be certified completed before you can begin qualification for a particular watchstation. Prerequisites may include schools, watchstation qualifications from other PQS books, and fundamentals, systems, or watchstation qualifications from this book. Prior to signing off each prerequisite line item, the Qualifier must verify completion from existing records. Record the date of actual completion, not the sign-off date.
- WATCHSTATION Performance, which is the practical factors portion of your qualification. The performance is broken down as follows:

Tasks (routine operating tasks that are performed frequently)
Infrequent Tasks
Abnormal Conditions
Emergencies
Training Watches

If there are multiple watchstations, a QUALIFICATION PROGRESS SUMMARY will appear at the end of the Standard.

300 INTRODUCTION TO WATCHSTATIONS (CONT'D)

300.3 OPERATING PROCEDURES

The PQS deliberately makes no attempt to specify the procedures to be used to complete a task or control or correct a casualty. The only proper sources of this information are the technical manuals, Engineering Operational Sequencing System (EOSS), Naval Air Training and Operating Procedures Standardization (NATOPS) or other policy-making documents prepared for a specific installation or a piece of equipment. Additionally, the level of accuracy required of a trainee may vary from school to school, ship to ship, and squadron to squadron based upon such factors as mission requirements. Thus, proficiency may be confirmed only through demonstrated performance at a level of competency sufficient to satisfy the Commanding Officer.

300.4 DISCUSSION ITEMS

Though actual performance of evolutions is always preferable to observation or discussion, some items listed in each watchstation may be too hazardous or time consuming to perform or simulate. Therefore, you may be required to discuss such items with your Qualifier.

300.5 NUMBERING

Each Final Qualification is assigned both a watchstation number and a NAVEDTRA Final Qualification number. The NAVEDTRA number is to be used for recording qualifications in service and training records.

300.6 HOW TO COMPLETE

After completing the required prerequisites applicable to a particular task, you may perform the task under the supervision of a qualified watchstander. If you satisfactorily perform the task and can explain each step, your Qualifier will sign you off for that task. After all line items have been completed, your Qualifier will verify Final Qualification by signing and dating the Final Qualification pages.

301 SURFACE WARFARE OFFICER (SWO) ENGINEERING
(STEAM PLANT)

NAME_____

RANK_____

This page is to be used as a record of satisfactory completion of designated sections of the Personnel Qualification Standard (PQS). Only specified supervisors may signify completion of applicable sections either by written or oral examination, or by observation of performance. The examination or checkout need not cover every item; however, a sufficient number should be covered to demonstrate the examinee's knowledge. Should supervisors *give away* their signatures, unnecessary difficulties can be expected in future routine operations.

A copy of this completed page shall be kept in the individual's training jacket.

The trainee has completed all PQS requirements for this watchstation. Recommend designation as a qualified SURFACE WARFARE OFFICER (SWO) ENGINEERING (STEAM PLANT) (NAVEDTRA 43101-3F).

RECOMMENDED_____ DATE_____
Department Head

RECOMMENDED_____ DATE_____
Engineer Officer

RECOMMENDED_____ DATE_____
Senior Watch Officer

QUALIFIED_____ DATE_____
Commanding Officer or Designated Representative

WATCHSTATION 301

301 SURFACE WARFARE OFFICER (SWO) ENGINEERING (STEAM PLANT)

Estimated completion time: 12 weeks

301.1 PREREQUISITES

FOR OPTIMUM TRAINING EFFECTIVENESS, THE FOLLOWING ITEMS SHOULD BE COMPLETED PRIOR TO STARTING YOUR ASSIGNED TASKS BUT SHALL BE COMPLETED PRIOR TO FINAL WATCHSTATION QUALIFICATION.

301.1.1 SCHOOLS:

Damage Control Repair Party Leader, K-495-0040 (RECOMMENDED)

Completed _____
(Qualifier and Date)

.2 PQS QUALIFICATIONS:

Fundamentals from Damage Control (NAVEDTRA 43119-H)

115 Investigation

Completed _____
(Qualifier and Date)

116 Stability

Completed _____
(Qualifier and Date)

Systems from Damage Control (NAVEDTRA 43119-H)

210 Aqueous Film-Forming Foam

Completed _____
(Qualifier and Date)

216 Casualty Power Distribution

Completed _____
(Qualifier and Date)

301 SURFACE WARFARE OFFICER (SWO) ENGINEERING (STEAM PLANT) (CONT'D)

301.1.3 FUNDAMENTALS FROM THIS PQS:

101 Navy Occupational Safety and Health Program

Completed _____ 2% of Watchstation
(Qualifier and Date)

102 Engineering Administration

Completed _____ 2% of Watchstation
(Qualifier and Date)

103 Pollution Control

Completed _____ 2% of Watchstation
(Qualifier and Date)

104 Mechanical

Completed _____ 2% of Watchstation
(Qualifier and Date)

105 Electrical

Completed _____ 2% of Watchstation
(Qualifier and Date)

106 Lubricating and Hydraulic Oil

Completed _____ 2% of Watchstation
(Qualifier and Date)

107 Hydraulic/Pneumatic

Completed _____ 2% of Watchstation
(Qualifier and Date)

108 Distilling Plant/Potable Water

Completed _____ 2% of Watchstation
(Qualifier and Date)

109 Air Conditioning and Refrigeration

Completed _____ 2% of Watchstation
(Qualifier and Date)

301 SURFACE WARFARE OFFICER (SWO) ENGINEERING (STEAM PLANT) (CONT'D)

301.1.3 110 Interior Communications

Completed _____ 2% of Watchstation
(Qualifier and Date)

111 Degaussing

Completed _____ 2% of Watchstation
(Qualifier and Date)

112 Power Transmission

Completed _____ 2% of Watchstation
(Qualifier and Date)

113 Propulsion Cycle

Completed _____ 2% of Watchstation
(Qualifier and Date)

114 Propulsion Boiler

Completed _____ 2% of Watchstation
(Qualifier and Date)

115 Steam Turbine

Completed _____ 2% of Watchstation
(Qualifier and Date)

.4 SYSTEMS FROM THIS PQS:

201 Ship's Service 60/400 Hz Electrical Distribution

Completed _____ 2% of Watchstation
(Qualifier and Date)

202 Propulsion Drive Train

Completed _____ 2% of Watchstation
(Qualifier and Date)

203 Main Lube Oil

Completed _____ 2% of Watchstation
(Qualifier and Date)

301 SURFACE WARFARE OFFICER (SWO) ENGINEERING (STEAM PLANT) (CONT'D)

301.1.4 204 Fuel Oil Filling, Transfer, Storage, and Ballast

Completed _____ 2% of Watchstation
(Qualifier and Date)

205 Compressed Air

Completed _____ 2% of Watchstation
(Qualifier and Date)

206 Steering

Completed _____ 2% of Watchstation
(Qualifier and Date)

207 Gyrocompass

Completed _____ 2% of Watchstation
(Qualifier and Date)

208 Propulsion Boiler

Completed _____ 2% of Watchstation
(Qualifier and Date)

209 Steam Propulsion Turbine

Completed _____ 2% of Watchstation
(Qualifier and Date)

210 Main Steam

Completed _____ 2% of Watchstation
(Qualifier and Date)

211 Auxiliary Steam

Completed _____ 2% of Watchstation
(Qualifier and Date)

212 150 psi Auxiliary Steam

Completed _____ 2% of Watchstation
(Qualifier and Date)

301 SURFACE WARFARE OFFICER (SWO) ENGINEERING (STEAM PLANT) (CONT'D)

301.1.4 213 Auxiliary Exhaust Steam

Completed _____ 2% of Watchstation
(Qualifier and Date)

214 Main Feed

Completed _____ 2% of Watchstation
(Qualifier and Date)

215 Main Condensate

Completed _____ 2% of Watchstation
(Qualifier and Date)

216 Steam Fuel Oil Service

Completed _____ 2% of Watchstation
(Qualifier and Date)

301.2 TASKS

For the tasks listed below:

- A. What are the steps of this procedure?
- B. What control/coordination is required?
- C. What means of communications are used?
- D. What safety precautions must be observed?
- E. What parameters/operating limits must be monitored?
- F. Satisfactorily perform this task.

Questions

301.2.1 Tour all engineering spaces with a qualified EOOW:

- a. Identify and discuss installed equipment F

(Signature and Date)

- b. Identify and discuss alternate accesses F

(Signature and Date)

301 SURFACE WARFARE OFFICER (SWO) ENGINEERING (STEAM PLANT) (CONT'D)

		<u>Questions</u>
301.2.1	c. Identify and discuss installed firefighting and damage control equipment	F
	_____ (Signature and Date)	
.2	Observe operation of engineering plant from cold iron to auxiliary steaming (EOOW Watchstation)	A B C D F
	_____ (Signature and Date)	
.3	Observe operation of engineering plant from auxiliary steaming to underway (EOOW Watchstation)	A B C D F
	_____ (Signature and Date)	
.4	Observe engineering plant from underway to auxiliary steaming (EOOW Watchstation)	A B C D F
	_____ (Signature and Date)	
.5	Observe engineering plant from auxiliary steaming to cold iron (EOOW Watchstation)	A B C D F
	_____ (Signature and Date)	
.6	Observe EOOW relief/turnover	A F
	_____ (Signature and Date)	
.7	Observe steering checks from aftersteering	A B C D E F
	_____ (Signature and Date)	
.8	Observe SSTG starting, stopping, loading, unloading, and paralleling operations	A B C D E F
	_____ (Signature and Date)	

301 SURFACE WARFARE OFFICER (SWO) ENGINEERING (STEAM PLANT) (CONT'D)

301.2.9	Observe boiler surface blow	<u>Questions</u> A B C D E F
	_____ (Signature and Date)	
.10	Observe boiler soot blow	A B C D F
	_____ (Signature and Date)	
.11	Observe fueling operations from topside fueling station and CCS	A B C D E F
	_____ (Signature and Date)	
COMPLETED .2 AREA COMPRISES 12% OF WATCHSTATION.		
301.3	<u>INFREQUENT TASKS</u> – None to be discussed.	
301.4	<u>ABNORMAL CONDITIONS</u> – None to be discussed.	
301.5	<u>EMERGENCIES</u>	
	For the emergencies listed below:	
	A. What indications and alarms are received? B. How does this emergency affect other operations/equipment/watchstations? C. Observe the performance or simulation of the EOCC actions for this emergency.	
301.5.1	Low water in boiler	<u>Questions</u> A B C
	_____ (Signature and Date)	
.2	High water in boiler	A B C
	_____ (Signature and Date)	
.3	Loss of main feed control	A B C
	_____ (Signature and Date)	

301 SURFACE WARFARE OFFICER (SWO) ENGINEERING (STEAM PLANT) (CONT'D)

		<u>Questions</u> A B C
301.5.4	Ruptured boiler tube _____ (Signature and Date)	
.5	Fire in air casing _____ (Signature and Date)	A B C
.6	Loss of main lube oil pressure _____ (Signature and Date)	A B C
.7	Loss of main engine vacuum/hot condenser _____ (Signature and Date)	A B C
.8	Unusual noise/vibration in main engine _____ (Signature and Date)	A B C
.9	Hot bearing (main engine/reduction gear/line shaft bearing/ uncontrolled bearing temperature) _____ (Signature and Date)	A B C
.10	Jammed throttle _____ (Signature and Date)	A B C
.11	Class C fire in switchboards _____ (Signature and Date)	A B C
.12	Class C fire in a generator _____ (Signature and Date)	A B C

301 SURFACE WARFARE OFFICER (SWO) ENGINEERING (STEAM PLANT) (CONT'D)

Questions

301.5.13 Class B fire in main engineering space

A B C

(Signature and Date)

.14 Loss of control air

A B C

(Signature and Date)

.15 Boiler explosion

A B C

(Signature and Date)

.16 Major steam leak

A B C

(Signature and Date)

.17 White smoke

A B C

(Signature and Date)

.18 Black smoke

A B C

(Signature and Date)

.19 Major fuel oil leak

A B C

(Signature and Date)

.20 Major lube oil leak

A B C

(Signature and Date)

COMPLETED .5 AREA COMPRISES 14% OF WATCHSTATION.

**301 SURFACE WARFARE OFFICER (SWO) ENGINEERING (STEAM PLANT)
(CONT'D)**

301.6 WATCHES

301.6.1 OBSERVE THE FOLLOWING WATCHES:

EOOW (normal underway steaming)

(Signature and Date)

EOOW (restricted maneuvering)

(Signature and Date)

EOOW (main space fire drill)

(Signature and Date)

DCC (main space fire drill)

(Signature and Date)

COMPLETED .6 AREA COMPRISES 12% OF WATCHSTATION.

301.7 EXAMINATIONS (OPTIONAL EXCEPT AS REQUIRED BY TYCOM/ISIC, ETC.)

301.7.1 EXAMINATIONS Pass a written examination

(Signature and Date)

.2 EXAMINATIONS Pass an oral examination board

(Signature and Date)

302 SURFACE WARFARE OFFICER (SWO) ENGINEERING
(DIESEL PLANT)

NAME_____

RANK_____

This page is to be used as a record of satisfactory completion of designated sections of the Personnel Qualification Standard (PQS). Only specified supervisors may signify completion of applicable sections either by written or oral examination, or by observation of performance. The examination or checkout need not cover every item; however, a sufficient number should be covered to demonstrate the examinee's knowledge. Should supervisors *give away* their signatures, unnecessary difficulties can be expected in future routine operations.

A copy of this completed page shall be kept in the individual's training jacket.

The trainee has completed all PQS requirements for this watchstation. Recommend designation as a qualified SURFACE WARFARE OFFICER (SWO) ENGINEERING (DIESEL PLANT) (NAVEDTRA 43101-3F).

RECOMMENDED_____ DATE_____
Department Head

RECOMMENDED_____ DATE_____
Engineer Officer

RECOMMENDED_____ DATE_____
Senior Watch Officer

QUALIFIED_____ DATE_____
Commanding Officer or Designated Representative

302

SURFACE WARFARE OFFICER (SWO) ENGINEERING (DIESEL PLANT)

WATCHSTATION 302

Estimated completion time: 12 weeks

302.1 PREREQUISITES

FOR OPTIMUM TRAINING EFFECTIVENESS, THE FOLLOWING ITEMS SHOULD BE COMPLETED PRIOR TO STARTING YOUR ASSIGNED TASKS BUT SHALL BE COMPLETED PRIOR TO FINAL WATCHSTATION QUALIFICATION.

302.1.1 SCHOOLS:

Damage Control Repair Party Leader, K-495-0040 (RECOMMENDED)

Completed _____
(Qualifier and Date)

.2 PQS QUALIFICATIONS:

Fundamentals from Damage Control (NAVEDTRA 43119-H)

115 Investigation

Completed _____
(Qualifier and Date)

116 Stability

Completed _____
(Qualifier and Date)

Systems from Damage Control (NAVEDTRA 43119-H)

210 Aqueous Film-Forming Foam

Completed _____
(Qualifier and Date)

216 Casualty Power Distribution

Completed _____
(Qualifier and Date)

302 SURFACE WARFARE OFFICER (SWO) ENGINEERING (DIESEL PLANT) (CONT'D)

302.1.3 FUNDAMENTALS FROM THIS PQS:

101 Navy Occupational Safety and Health Program

Completed _____ 2% of Watchstation
(Qualifier and Date)

102 Engineering Administration

Completed _____ 2% of Watchstation
(Qualifier and Date)

103 Pollution Control

Completed _____ 2% of Watchstation
(Qualifier and Date)

104 Mechanical

Completed _____ 2% of Watchstation
(Qualifier and Date)

105 Electrical

Completed _____ 2% of Watchstation
(Qualifier and Date)

106 Lubricating and Hydraulic Oil

Completed _____ 2% of Watchstation
(Qualifier and Date)

107 Hydraulic/Pneumatic

Completed _____ 2% of Watchstation
(Qualifier and Date)

108 Distilling Plant/Potable Water

Completed _____ 2% of Watchstation
(Qualifier and Date)

109 Air Conditioning and Refrigeration

Completed _____ 2% of Watchstation
(Qualifier and Date)

302 SURFACE WARFARE OFFICER (SWO) ENGINEERING (DIESEL PLANT) (CONT'D)

302.1.3 110 Interior Communications

Completed _____ 2% of Watchstation
(Qualifier and Date)

111 Degaussing

Completed _____ 2% of Watchstation
(Qualifier and Date)

112 Power Transmission

Completed _____ 2% of Watchstation
(Qualifier and Date)

113 Propulsion Cycle

Completed _____ 2% of Watchstation
(Qualifier and Date)

116 Diesel Engine

Completed _____ 2% of Watchstation
(Qualifier and Date)

.4 SYSTEMS FROM THIS PQS:

201 Ship's Service 60/400 Hz Electrical Distribution

Completed _____ 2% of Watchstation
(Qualifier and Date)

202 Propulsion Drive Train

Completed _____ 2% of Watchstation
(Qualifier and Date)

203 Main Lube Oil

Completed _____ 2% of Watchstation
(Qualifier and Date)

204 Fuel Oil Filling, Transfer, Storage, and Ballast

Completed _____ 2% of Watchstation
(Qualifier and Date)

302 SURFACE WARFARE OFFICER (SWO) ENGINEERING (DIESEL PLANT) (CONT'D)

302.1.4 205 Compressed Air

Completed _____ 2% of Watchstation
(Qualifier and Date)

206 Steering

Completed _____ 2% of Watchstation
(Qualifier and Date)

207 Gyrocompass

Completed _____ 2% of Watchstation
(Qualifier and Date)

217 Main Propulsion Diesel Engine

Completed _____ 2% of Watchstation
(Qualifier and Date)

218 Diesel Fuel Oil Service

Completed _____ 2% of Watchstation
(Qualifier and Date)

219 Diesel Lube Oil

Completed _____ 2% of Watchstation
(Qualifier and Date)

220 Diesel Jacket Water Cooling

Completed _____ 2% of Watchstation
(Qualifier and Date)

221 Diesel Propulsion Control

Completed _____ 2% of Watchstation
(Qualifier and Date)

222 Controllable Pitch Propeller

Completed _____ 2% of Watchstation
(Qualifier and Date)

302 SURFACE WARFARE OFFICER (SWO) ENGINEERING (DIESEL PLANT) (CONT'D)

302.2 TASKS

For the tasks listed below:

- A. What are the steps of this procedure?
- B. What control/coordination is required?
- C. What means of communications are used?
- D. What safety precautions must be observed?
- E. What parameters/operating limits must be monitored?
- F. Satisfactorily perform this task.

Questions

302.2.1 Tour all engineering spaces with a qualified EOOW:

- a. Identify and discuss installed equipment

F

(Signature and Date)

- b. Identify and discuss alternate accesses

F

(Signature and Date)

- c. Identify and discuss installed firefighting and damage control equipment

F

(Signature and Date)

- .2 Observe operation of engineering plant from cold iron to auxiliary steaming (EOOW Watchstation)

A B C D F

(Signature and Date)

- .3 Observe operation of engineering plant from auxiliary steaming to underway (EOOW Watchstation)

A B C D F

(Signature and Date)

302 SURFACE WARFARE OFFICER (SWO) ENGINEERING (DIESEL PLANT) (CONT'D)

		<u>Questions</u>
302.2.4	Observe engineering plant from underway to auxiliary steaming (EOOW Watchstation)	A B C D F
	_____ (Signature and Date)	
.5	Observe engineering plant from auxiliary steaming to cold iron (EOOW Watchstation)	A B C D F
	_____ (Signature and Date)	
.6	Observe EOOW relief/turnover	A F
	_____ (Signature and Date)	
.7	Observe steering checks from aftersteering/VSP	A B C D E F
	_____ (Signature and Date)	
.8	Observe SSDG starting, stopping, loading, unloading, and paralleling operations from the electrical plant control station	A B C D E F
	_____ (Signature and Date)	
.9	Observe fueling operations from topside fueling station and CCS	A B C D E F
	_____ (Signature and Date)	
	COMPLETED .2 AREA COMPRISES 12% OF WATCHSTATION.	
302.3	<u>INFREQUENT TASKS</u> – None to be discussed.	
302.4	<u>ABNORMAL CONDITIONS</u> – None to be discussed.	

302 SURFACE WARFARE OFFICER (SWO) ENGINEERING (DIESEL PLANT) (CONT'D)

302.5 EMERGENCIES

For the emergencies listed below:

- A. What indications and alarms are received?
- B. How does this emergency affect other operations/equipment/watchstations?
- C. Observe the performance or simulation of the EOCC actions for this emergency.

Questions

302.5.1 MPDE overspeeds A B C

(Signature and Date)

.2 MPDE high jacket water temperature A B C

(Signature and Date)

.3 Unusual MPDE noise/vibration A B C

(Signature and Date)

.4 MPDE loss of fuel oil pressure A B C

(Signature and Date)

.5 MPDE loss of lube oil pressure A B C

(Signature and Date)

.6 MPDE loss of governor control A B C

(Signature and Date)

.7 MPDE crankcase explosion A B C

(Signature and Date)

302 SURFACE WARFARE OFFICER (SWO) ENGINEERING (DIESEL PLANT) (CONT'D)

		<u>Questions</u> A B C
302.5.8	Hot bearing (reduction gear/line shaft bearing)	
	_____ (Signature and Date)	
.9	Unusual reduction gear/IFVG noise/vibration	A B C
	_____ (Signature and Date)	
.10	Loss of lube oil pressure to reduction gear	A B C
	_____ (Signature and Date)	
.11	Loss of SSDG	A B C
	_____ (Signature and Date)	
.12	Class C fire in generators	A B C
	_____ (Signature and Date)	
.13	Loss of CPP control	A B C
	_____ (Signature and Date)	
.14	Loss of CPP pressure	A B C
	_____ (Signature and Date)	
.15	Loss of lube oil pressure for VSP	A B C
	_____ (Signature and Date)	
.16	Class B fire in main engineering space	A B C
	_____ (Signature and Date)	

302 SURFACE WARFARE OFFICER (SWO) ENGINEERING (DIESEL PLANT) (CONT'D)

Questions

302.5.17 Class C fire in switchboard

A B C

(Signature and Date)

.18 Loss of clutch air

A B C

(Signature and Date)

.19 Major fuel oil leak

A B C

(Signature and Date)

.20 Major lube oil leak

A B C

(Signature and Date)

.21 Major hydraulic oil leak

A B C

(Signature and Date)

COMPLETED .5 AREA COMPRISES 20% OF WATCHSTATION.

**302 SURFACE WARFARE OFFICER (SWO) ENGINEERING (DIESEL PLANT)
(CONT'D)**

302.6 WATCHES

302.6.1 OBSERVE THE FOLLOWING WATCHES:

EOOW (normal underway steaming)

(Signature and Date)

EOOW (restricted maneuvering)

(Signature and Date)

EOOW (main space fire drill)

(Signature and Date)

DCC (main space fire drill)

(Signature and Date)

COMPLETED .6 AREA COMPRISES 14% OF WATCHSTATION.

302.7 EXAMINATIONS (OPTIONAL EXCEPT AS REQUIRED BY TYCOM/ISIC, ETC.)

302.7.1 EXAMINATIONS Pass a written examination

(Signature and Date)

.2 EXAMINATIONS Pass an oral examination board

(Signature and Date)

303 SURFACE WARFARE OFFICER (SWO) ENGINEERING
(GAS TURBINE)

NAME_____

RANK_____

This page is to be used as a record of satisfactory completion of designated sections of the Personnel Qualification Standard (PQS). Only specified supervisors may signify completion of applicable sections either by written or oral examination, or by observation of performance. The examination or checkout need not cover every item; however, a sufficient number should be covered to demonstrate the examinee's knowledge. Should supervisors *give away* their signatures, unnecessary difficulties can be expected in future routine operations.

A copy of this completed page shall be kept in the individual's training jacket.

The trainee has completed all PQS requirements for this watchstation. Recommend designation as a qualified SURFACE WARFARE OFFICER (SWO) ENGINEERING (GAS TURBINE) (NAVEDTRA 43101-3F).

RECOMMENDED_____ DATE_____
Department Head

RECOMMENDED_____ DATE_____
Engineer Officer

RECOMMENDED_____ DATE_____
Senior Watch Officer

QUALIFIED_____ DATE_____
Commanding Officer or Designated Representative

303

SURFACE WARFARE OFFICER (SWO) ENGINEERING (GAS TURBINE)

WATCHSTATION 303

Estimated completion time: 12 weeks

303.1 PREREQUISITES

FOR OPTIMUM TRAINING EFFECTIVENESS, THE FOLLOWING ITEMS SHOULD BE COMPLETED PRIOR TO STARTING YOUR ASSIGNED TASKS BUT SHALL BE COMPLETED PRIOR TO FINAL WATCHSTATION QUALIFICATION.

303.1.1 SCHOOLS:

Damage Control Repair Party Leader, K-495-0040 (RECOMMENDED)

Completed _____
(Qualifier and Date)

.2 PQS QUALIFICATIONS:

Fundamentals from Damage Control (NAVEDTRA 43119-H)

115 Investigation

Completed _____
(Qualifier and Date)

116 Stability

Completed _____
(Qualifier and Date)

Systems from Damage Control (NAVEDTRA 43119-H) (Required):

210 Aqueous Film-Forming Foam

Completed _____
(Qualifier and Date)

216 Casualty Power Distribution

Completed _____
(Qualifier and Date)

303 SURFACE WARFARE OFFICER (SWO) ENGINEERING (GAS TURBINE) (CONT'D)

303.1.3 FUNDAMENTALS FROM THIS PQS:

101 Navy Occupational Safety and Health Program

Completed _____ 2% of Watchstation
(Qualifier and Date)

102 Engineering Administration

Completed _____ 2% of Watchstation
(Qualifier and Date)

103 Pollution Control

Completed _____ 2% of Watchstation
(Qualifier and Date)

104 Mechanical

Completed _____ 2% of Watchstation
(Qualifier and Date)

105 Electrical

Completed _____ 2% of Watchstation
(Qualifier and Date)

106 Lubricating and Hydraulic Oil

Completed _____ 2% of Watchstation
(Qualifier and Date)

107 Hydraulic/Pneumatic

Completed _____ 2% of Watchstation
(Qualifier and Date)

108 Distilling Plant/Potable Water

Completed _____ 2% of Watchstation
(Qualifier and Date)

109 Air Conditioning and Refrigeration

Completed _____ 2% of Watchstation
(Qualifier and Date)

303 SURFACE WARFARE OFFICER (SWO) ENGINEERING (GAS TURBINE) (CONT'D)

303.1.3 110 Interior Communication

Completed _____ 2% of Watchstation
(Qualifier and Date)

111 Degaussing

Completed _____ 2% of Watchstation
(Qualifier and Date)

112 Power Transmission

Completed _____ 2% of Watchstation
(Qualifier and Date)

113 Propulsion Cycle

Completed _____ 2% of Watchstation
(Qualifier and Date)

117 Gas Turbine

Completed _____ 2% of Watchstation
(Qualifier and Date)

.4 SYSTEMS FROM THIS PQS:

201 Ship's Service 60/400 Hz Electrical Distribution

Completed _____ 2% of Watchstation
(Qualifier and Date)

202 Propulsion Drive Train

Completed _____ 2% of Watchstation
(Qualifier and Date)

203 Main Lube Oil

Completed _____ 2% of Watchstation
(Qualifier and Date)

204 Fuel Oil Filling, Transfer, Storage, and Ballast

Completed _____ 2% of Watchstation
(Qualifier and Date)

303 SURFACE WARFARE OFFICER (SWO) ENGINEERING (GAS TURBINE) (CONT'D)

303.1.4 205 Compressed Air

Completed _____ 2% of Watchstation
(Qualifier and Date)

206 Steering

Completed _____ 2% of Watchstation
(Qualifier and Date)

207 Gyrocompass

Completed _____ 2% of Watchstation
(Qualifier and Date)

222 Controllable Pitch Propeller

Completed _____ 2% of Watchstation
(Qualifier and Date)

223 Gas Turbine Air Intake and Exhaust

Completed _____ 2% of Watchstation
(Qualifier and Date)

224 Gas Turbine Engine and Module

Completed _____ 2% of Watchstation
(Qualifier and Date)

225 Gas Turbine Fuel Oil Service

Completed _____ 2% of Watchstation
(Qualifier and Date)

226 Gas Turbine Engine Control

Completed _____ 2% of Watchstation
(Qualifier and Date)

303 SURFACE WARFARE OFFICER (SWO) ENGINEERING (GAS TURBINE) (CONT'D)

303.2 TASKS

For the tasks listed below:

- A. What are the steps of this procedure?
- B. What control/coordination is required?
- C. What means of communications are used?
- D. What safety precautions must be observed?
- E. What parameters/operating limits must be monitored?
- F. Satisfactorily perform this task.

Questions

303.2.1 Tour all engineering spaces with a qualified EOOW:

- a. Identify and discuss installed equipment

F

(Signature and Date)

- b. Identify and discuss alternate accesses

F

(Signature and Date)

- c. Identify and discuss installed firefighting and damage control equipment

F

(Signature and Date)

- .2 Observe operation of engineering plant from cold iron to auxiliary steaming (EOOW Watchstation)

A B C D F

(Signature and Date)

- .3 Observe operation of engineering plant from auxiliary steaming to underway (EOOW Watchstation)

A B C D F

(Signature and Date)

303 SURFACE WARFARE OFFICER (SWO) ENGINEERING (GAS TURBINE) (CONT'D)

Questions

- | | | |
|---------|--|-------------|
| 303.2.4 | Observe engineering plant from underway to auxiliary steaming
(EOOW Watchstation) | A B C D F |
| | _____
(Signature and Date) | |
| .5 | Observe engineering plant from auxiliary steaming to cold iron
(EOOW Watchstation) | A B C D F |
| | _____
(Signature and Date) | |
| .6 | Observe EOOW relief/turnover | A F |
| | _____
(Signature and Date) | |
| .7 | Observe steering checks from aftersteering | A B C D E F |
| | _____
(Signature and Date) | |
| .8 | Observe SSGTG/SSDG starting, stopping, loading, unloading,
and paralleling operations from electrical plant control console | A B C D E F |
| | _____
(Signature and Date) | |
| .9 | Observe fueling operations from topside fueling station and CCS | A B C D E F |
| | _____
(Signature and Date) | |
| | COMPLETED .2 AREA COMPRISES 14% OF WATCHSTATION. | |
| 303.3 | <u>INFREQUENT TASKS</u> – None to be discussed. | |
| 303.4 | <u>ABNORMAL CONDITIONS</u> – None to be discussed. | |

303 SURFACE WARFARE OFFICER (SWO) ENGINEERING (GAS TURBINE) (CONT'D)

303.5 EMERGENCIES

For the emergencies listed below:

- A. What indications and alarms are received?
- B. How does this emergency affect other operations/equipment/watchstations?
- C. Observe the performance or simulation of the EOCC actions for this emergency.

		<u>Questions</u> A B C
303.5.1	PLA actuator failure	

	(Signature and Date)	
.2	Excessive gas turbine vibrations	A B C

	(Signature and Date)	
.3	Loss of gas turbine lube oil pressure	A B C

	(Signature and Date)	
.4	Power turbine/gas generator overspeed	A B C

	(Signature and Date)	
.5	High power turbine inlet temperature	A B C

	(Signature and Date)	
.6	Class B fire in GTM module	A B C

	(Signature and Date)	
.7	Loss of fuel oil pressure	A B C

	(Signature and Date)	

303 SURFACE WARFARE OFFICER (SWO) ENGINEERING (GAS TURBINE) (CONT'D)

		<u>Questions</u> A B C
303.5.8	Loss of reduction gear lube oil pressure _____ (Signature and Date)	
.9	Unusual noise/vibration in MRG _____ (Signature and Date)	A B C
.10	Hot bearing MRG/line shaft bearing _____ (Signature and Date)	A B C
.11	Loss of CPP control _____ (Signature and Date)	A B C
.12	Loss of CPP pressure _____ (Signature and Date)	A B C
.13	SSGTG/SSDG casualties _____ (Signature and Date)	A B C
.14	Class C fire in generator _____ (Signature and Date)	A B C
.15	Class C fire in switchboard _____ (Signature and Date)	A B C
.16	Major fuel oil leak _____ (Signature and Date)	A B C

303 SURFACE WARFARE OFFICER (SWO) ENGINEERING (GAS TURBINE) (CONT'D)

Questions

303.5.17 Major lube oil leak

A B C

(Signature and Date)

.18 Major hydraulic oil leak

A B C

(Signature and Date)

.19 Class B fire in main space

A B C

(Signature and Date)

COMPLETED .5 AREA COMPRISES 20% OF WATCHSTATION.

303.6 WATCHES

303.6.1 OBSERVE THE FOLLOWING WATCHES:

EOOW (normal underway steaming)

(Signature and Date)

EOOW (restricted maneuvering)

(Signature and Date)

EOOW (main space fire drill)

(Signature and Date)

DCC (main space fire drill)

(Signature and Date)

COMPLETED .6 AREA COMPRISES 14% OF WATCHSTATION.

**303 SURFACE WARFARE OFFICER (SWO) ENGINEERING (GAS TURBINE)
(CONT'D)**

303.7 EXAMINATIONS (OPTIONAL EXCEPT AS REQUIRED BY TYCOM/ISIC, ETC.)

303.7.1 EXAMINATIONS Pass a written examination

(Signature and Date)

.2 EXAMINATIONS Pass an oral examination board

(Signature and Date)

**QUALIFICATION PROGRESS SUMMARY FOR
SURFACE WARFARE OFFICER (SWO) ENGINEERING**

NAME _____ RANK _____

This qualification progress summary is used to track the progress of a trainee in the watchstations for this PQS and ensure awareness of remaining tasks. It should be kept by the individual or in the individual's training jacket and updated with an appropriate signature (Training Petty Officer, Division Officer, Senior Watch Officer, etc.) as watchstations are completed.

301 SURFACE WARFARE OFFICER (SWO) ENGINEERING (STEAM PLANT)

Completed _____ Date _____
(Signature)

302 SURFACE WARFARE OFFICER (SWO) ENGINEERING (DIESEL PLANT)

Completed _____ Date _____
(Signature)

303 SURFACE WARFARE OFFICER (SWO) ENGINEERING (GAS TURBINE)

Completed _____ Date _____
(Signature)

LIST OF REFERENCES USED IN THIS PQS

CINCLANTFLT/PACFLTINST 4790.3 (Change 5), Joint Fleet Maintenance Manual
Commanding Officer's Standing Orders
COMNAVSURFORINST 3502.1, Surface Force Training Manual
Engineering Department Organization and Regulations Manual (EDORM)
Engineering Operational Sequencing System (EOSS)
Introduction to Naval Engineering, Second Edition
NAVEDTRA 14073, Electrician's Mate 3 & 2
NAVEDTRA 14076, Engineman 2
NAVEDTRA 14077, Engineman 3
NAVEDTRA 14104, Fireman
NAVEDTRA 14105, Fluid Power
NAVEDTRA 14113, Gas Turbine Systems Technician (Electrical) 3/Gas Turbine Systems Technician (Mechanical) 3, Vol. 1
NAVEDTRA 14114, Gas Turbine Systems Technician (Electrical) 3/Gas Turbine Systems Technician (Mechanical) 3, Vol. 2
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Propulsion Plant Manual (PPM)
Ship's Damage Control Book
Ships Information Book (SIB)
Ships Instructions

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